

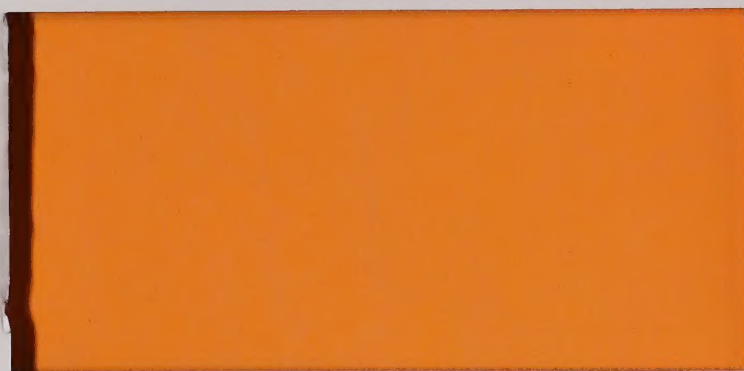
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SINGER

INSTRUMENTATION

PRELIMINARY
OPERATOR'S HANDBOOK
FOR
PROGRAMMER
MODEL CP7





WARRANTY

PRELIMINARY OPERATOR'S HANDBOOK FOR PROGRAMMER MODEL CP7

1/78

SINGER INSTRUMENTATION
5340 Alla Road
Los Angeles, California 90066

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|---|--|
| 1. Model or Type | 5. Approximate number of hours in use. |
| 2. Serial Number | 6. Has maintenance action been previously requested. |
| 3. Description of trouble(1) | 7. Other comments. |
| 4. Approximate date instrument was placed in operation. | |

(1) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken and any other relevant data.

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Attention: Engineering Department

This Preliminary Manual is supplied to permit earliest possible delivery of your instrument. The information is as complete as possible at this time.

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Type or print your full name and address in the spaces provided. Be sure to enter the full serial number of the instrument. The final manual(s) will not be shipped until the address card is received.

Please send the complete instruction manual for the equipment described below.

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I. SYSTEM DESCRIPTION

- 1.0 Introduction. The CP7 is a controller designed to operate Singer Instrumentation Series 7 receivers. Its input interface is an IEEE 488/1975 general purpose instrumentation bus. Thus, the CP7 can be used with a large number of desk top calculators, smart terminals, and small digital computers to obtain digital RF interference data.
- 1.1 Range of Control. The CP7 is designed to control Singer Instrumentation receivers covering the frequency range of 20 Hz to 18 GHz. These receivers are the NM7, NM17/27, NM37/57, and NM67. When these receivers are connected into the CP7 control system and operated in the local control mode, the operator has all of the normal front panel control functions available for his use. By switching the receivers into the remote mode, the CP7 takes over all of the front panel control functions.
- 1.2 Control Functions. The CP7, operated in a local mode, has all of the normal control functions available from the receiver. That is, one can tune the receivers, set bandwidths and attenuators, etc. In addition to these normal receiver functions, a series of special control functions is available. Utilizing the CP7, receivers can be set to sweep from any start frequency to any stop frequency, within the range of the receiving system. The CP7 automatically selects the proper receiver and band to accomplish the frequency sweep programmed by the operator.
- 1.3 X-Y Recorder. The CP7 contains digital to analog converter outputs which can be used to drive an analog X-Y recorder. This analog recording system can be used as a primary recording system for interference data being produced by the Series 7 Measurement System. The format of this recording system can be the normal 1, 4, 8, 16, 24 band plots which are in general use by the RFI industry. It also has the capability to automatically scale the specified sweep frequency in either a linear or semi-log plot of amplitude versus frequency. Internally programmed correction factors can be provided which allow this plot to use final engineering units.

- 1.4 Oscilloscope. A separate digital to analog converter provides a scaled X-axis drive voltage for an oscilloscope monitor. The Y-axis of the receivers would be connected directly to the log video output signal. In using the oscilloscope output, sweep rates of 30 times per second can be obtained. This sweeping capability provides the user with a spectrum analyzer type display.
- 1.5 IEEE 488/1975 Bus. The CP7 is designed to connect into the IEEE 488/1975 instrument bus. Singer Instrumentation provides a complete operating system based on the use of a H-P 9815 desk top calculator. This implementation was chosen because of its extreme simplicity and low cost. Singer Instrumentation will provide all of the operational software necessary to implement automatic data gathering in compliance with MIL-STD-461/462 test requirements. A complete programming instruction manual for the CP7 using the H-P 9815 calculator will be supplied. Utilizing this manual, individual system users can easily program the receiving system to perform any special measurement requirements. All of the normal accessories supplied by Hewlett-Packard in support of the 9815 system can be integrated into this operating system at the user's discretion.
- 1.6 16-bit I/O Port. The CP7 computer interface unit provides a two-way communication path for data and control signals between the central processor and the EMI meter. This interface unit in the CP7 is a 16-bit I/O Port, with TTL comparable logic levels, timing, and control definition given in the operating instruction.
- 1.7 RS232C Interface. The CP7 has an RS232C interface, used for terminal communication. Data character format and data transmission format are in the operation instruction section of this manual.
- 1.8 Information. Further technical information can be obtained by contacting Jerry Rothhammer at Singer Instrumentation, 5340 Alla Road, Los Angeles, California, 90066, (213) 870-5461.

II. SPECIFICATIONS

2.0 Intoduction. This section contains information for the Model CP7 Microprocessor Controlled Programmer.

2.1 Video Display.

2.1.1 Resolution: ± 5.0 V, 12-bit binary A/D.

2.2 Input Power.

115 V RMS, 47 Hz to 420 Hz, approximately 105 watts.

230 V RMS, 47 Hz to 420 Hz, approximately 105 watts.

2.3 Dimensions.

Height: 8-3/4 inches.

Width: 16-3/4 inches.

Depth: 18-1/2 inches.

Weight: 49 pounds.

2.4 Input/Output Control Signals.

2.4.1 Receiver Control Signals: All control signals necessary to run the NM7, NM17/27, NM37/57, and the NM67 are provided by the CP7.

2.4.2 Plotter Control Signals:

a. Voltage Range: 0 V to 5 V nominal (X voltage).

b. Resolution: 12-bit binary.

c. Current Range: ± 20 milliamperes (limited).

d. Output Impedance: $Z_o = 1000$ ohm maximum.

e. Pen Control: Relay closure.

2.4.3 CRT Control Signals:

a. Voltage Range: 0 V to 5 V nominal (X voltage).

b. Resolution: 12-bit binary.

c. Current Range: ± 20 milliamperes.

d. Blanking: Relay closure.

e. Voltage range.

2.4.4 Remote Attenuator Control Signals: All control signals required to run the CIU7 are provided.

- a. Voltage: 0 V to +30 V.
- b. Current: 40.0 milliamperes.
- c. Logic: "True" = 0 volts.

2.4.5 Remote Interfaces. (IEEE Standard No. 488/1975.) Three remote interfaces are provided to control the CP7 from an external computer or calculator. These interfaces are:

- a. IEEE Standard 488/1975.
- b. RS232C
- c. 8-bit parallel I/O.

III. INSTALLATION

3.0 Preparation for Use.

3.0.1 Bench Operation. The Model CP7 Programmer is shipped ready for use as a bench-operated instrument. A folding down keyboard must be open for Local Operations. A pull-down tilt support is attached to the feet under the front for elevating the instrument if desired.

3.0.2 Rack Mounting. A set of adapter brackets and attaching screws are provided to mount the unit in a standard 19-inch rack. Remove the four feet and folding support from bottom of instrument.

3.0.3 AC Power Requirements. The Model CP7 is supplied with a 2ASB fuse for 115 V operation unless otherwise requested by a customer. For 230 V operation, set the circuit board switch to the 230 V side with a 1ASB fuse.

3.1 Rear Panel. (See Figure 3.1)

3.1.1 Introduction. Functional descriptions of the rear panel are in Table 3.1.

3.1.2 System Cabling. The typical system for the CP7 is given in Figure 3.2.

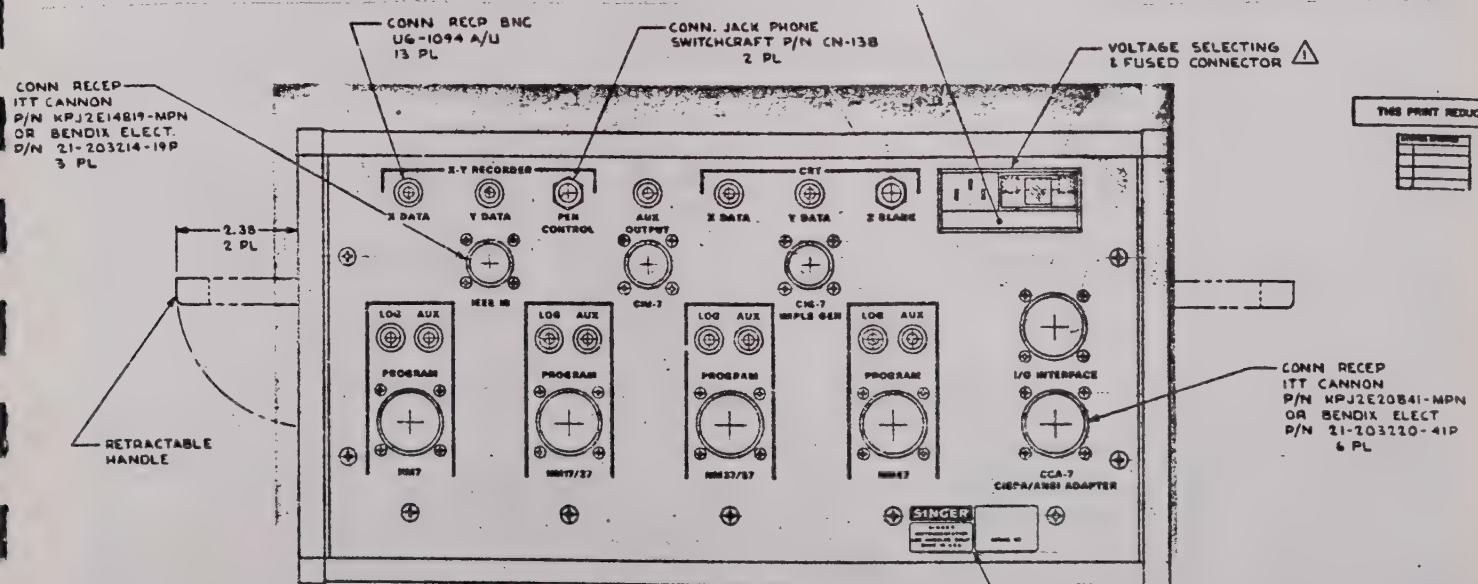
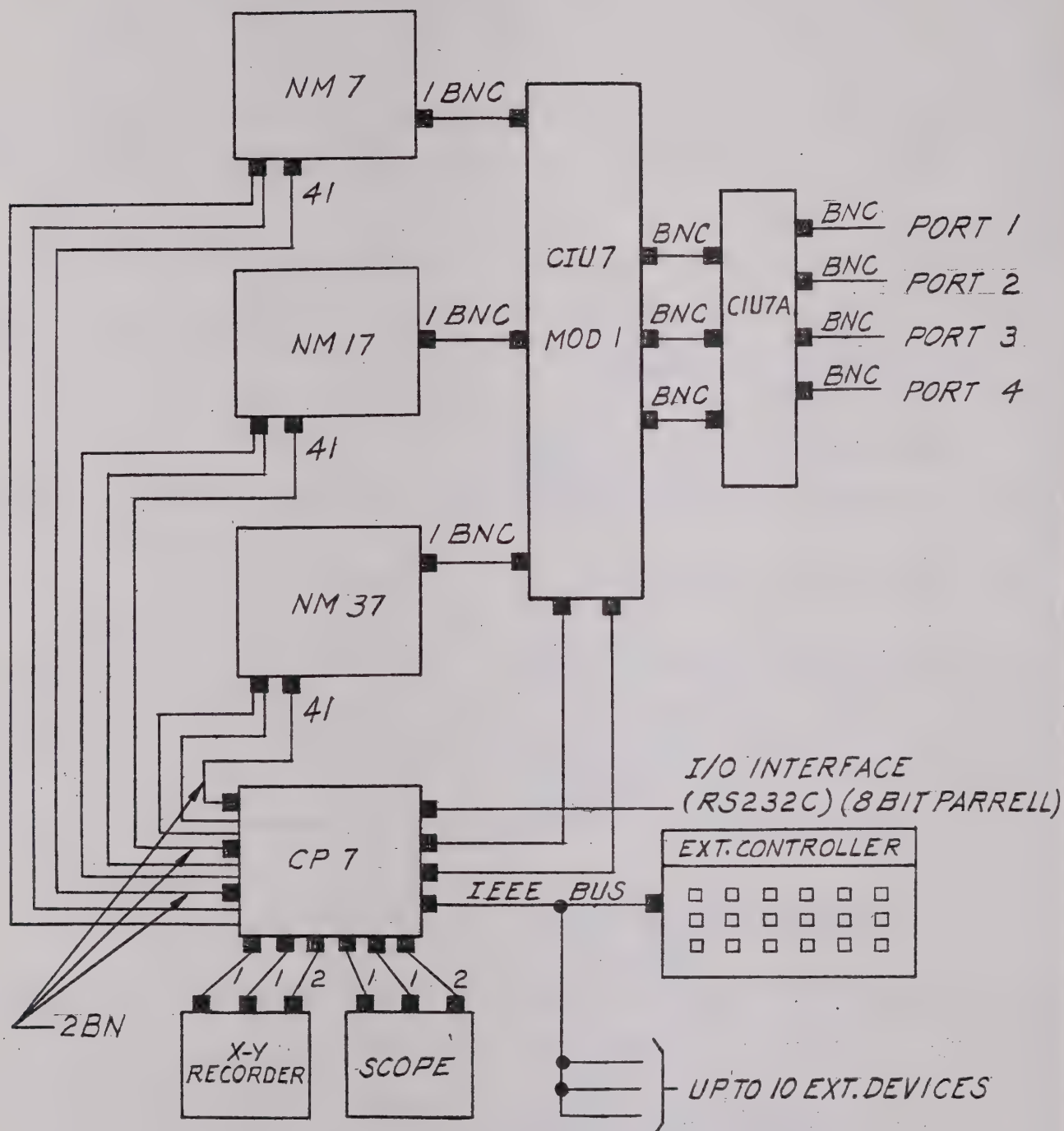


Figure 3.1



MODEL SI-700A SYSTEM CABLING

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LIBRASCOPE DIVISION		SIZE	FSCM NO.
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ISSUED SEE PAGE 1		SCALE	DWG NO. FIGURE 3.2
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TABLE 3.1
CONTROLS, INDICATORS, RECEPTACLES
REAR PANEL (CP7)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
1	NM-7	BNC receptacle (J12)	Log video input from the model NM-7 for CRT Display.
	LOG		
2	PROGRAM	41-pin recep- tacle (J21)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
3	AUX	BNC receptacle (J13)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-7 is selected by model CP7.
4	NM-17/27	BNC receptacle (J14)	Log video input from the model NM-17/27 for CRT Display.
	LOG		
5	PROGRAM	41-pin recep- tacle (J22)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
6	AUX	BNC receptacle (J15)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-17/27 is selected by model CP7.
7	NM-37/57	BNC receptacle (J16)	Log video input from the model NM-37/57 for CRT display.
	LOG		
8	PROGRAM	41-pin recep- tacle (J23)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
9	AUX	BNC receptacle (J17)	Any input to this jack appears at AUX OUTPUT jack (item 22) when model NM-37/57 is selected by model CP7.
10	NM-67	BNC receptacle (J18)	Log video input from the model NM-67 for CRT Display.
	LOG		

TABLE 3.1 (Cont'd)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
11	NM-67 (Cont'd)	41-pin receptacle (J24)	Provides the means of connecting the model CP7 to the model NM-7 for remote control.
	PROGRAM		
12	AUX	BNC receptacle (J 19)	Any input to this jack appears at AUX OUTPUT jack (item 19) when model NM-67 is selected by model CP7.
13	X-Y RECORDER	BNC receptacle (J 1)	Provides data to the X-axis of an X-Y recorder.
	X DATA		
14	Y DATA	BNC receptacle (J 2)	Provides data to the Y-axis of an X-Y recorder.
15	PEN CONTROL	Microphone jack receptacle (J3)	Provides a contact closure to drop the pen of an X-Y recorder.
16	CRT	BNC receptacle (J.6)	Provides data to the Y-axis of an oscilloscope.
	Y DATA		
17	X DATA	BNC receptacle (J 5)	Provides data to the X-axis of an oscilloscope.
18	Z BLANK	Microphone jack (J 7)	Provides both a contact closure and a contact opening for eliminating the retrace line for storage oscilloscope X-Y recording.
19	AUX OUTPUT	BNC receptacle (J31)	Provides output for any input to AUX receptacles, items 3, 6, 9, and 12 when appropriate receiver is selected by Band Select switches.
20	DELETED		
21	DELETED		
22	DELETED		
23	POWER	3-pin receptacle (J.8.)	Ac power input receptacle.

TABLE 3.1 (Cont'd)

ITEM	PANEL MARKING	DESCRIPTION	FUNCTION
24	CIU7	19-pin receptacle (J10)	Provides means of connecting the remote attenuator and receiver switching unit (CIU7) to the CP7.
25	CIG7 IMPLS.GEN.	19-pin receptacle (J11)	Provides means of connecting the CIU7 to the CP7 when the CIG7 operation is included in the CIU7.
26	IEEE IB	19-pin receptacle (J 9)	Provides the I/O signals for the IEEE 488/1975 Bus.
27	I/O INTERFACE	41-pin receptacle (J20)	Provides the I/O signals for the RS232C Interface and the 8-bit parallel interface.
28	CISPR/ANSI ADAPTER	41-pin receptacle (J23)	Provides a means of connecting the CCA7 (CISPR/ANSI ADAPTER) to the CP7.
29	AUX OUT	BNC receptacle (J4)	Provides auxilliary data from selected receivers.

IV. OPERATING INSTRUCTIONS

4.0 Local Operations.

4.0.1 Introduction. This section deals with the functional description of controls and receptacles, operating instruction, and calibration procedures for recording equipment.

4.0.2 Front Panel. The CP7's front panel consists of: Power Switch, Keyboard, and LED Display. The Power Switch is used to turn on the power to the CP7; the Keyboard (Figure 4.2, Table 4.1) is used to control the CP7 functions; and the LED Display is used to display the CP7's status and error messages.



Figure 4.1

4.0.3 Keyboard. The keyboard (Figure 4.2) consists of two groups of keys. The first group is a numerical keyboard containing numerals 0 through 9, a decimal point, four (4) unit keys, and a "clear entry" key. See Table 4.1 for uses of command keys.

The command to the CP7 consists of two classes. The first class is Set-up Commands, and the second class is Operation Commands. The Set-up Commands specify the CP7's parameters; i.e., Bandwidth, Detector Function, etc. The Operation Commands instruct the CP7 to perform a function such as setting the Receiver System to a specific frequency.

For keyboard code, see Table 4.2.

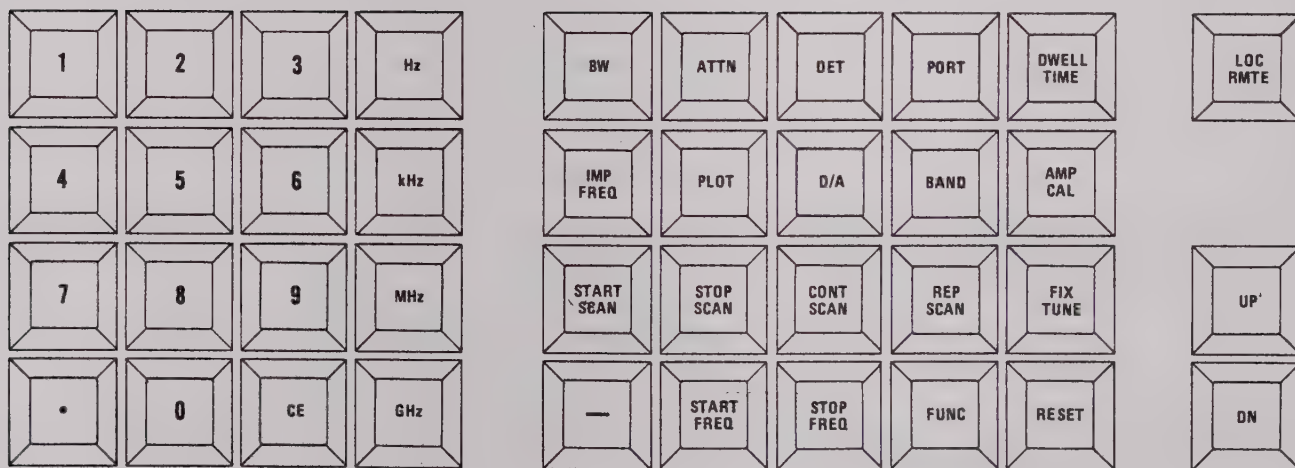


Figure 4.2

TABLE 4.1

KEYBOARD

KEY	BOARD COMMAND	RMTE COM.	FUNCTION	EXAMPLE
SET	UP COMMANDS			
LOC RMTE			This push push switch determines whether operation is controlled by the CP7 or by the remote digital controller.	
BW	i BW	iA	Controls the calibrated bandwidth of receiver being swept.	Set system to bandwidth i, where $i = 1 \text{ to } 4$
DET	i DET	iB	Controls the Detection mode in the receiver. CAL -- Disconnects the RF input and energizes on impulse generator for AMP. CAL. FI -- Select the field intensity. QP -- Select the Quasi-Peak PEAK-- Select the Peak signal value with holding time set by DWELL TIME -- maximum of 3.0 seconds	Set system detector to i where $i = 1 \text{ for CAL}$ $= 2 \text{ for FI}$ $= 3 \text{ for QP}$ $= 4 \text{ for PEAK}$
ATTN	i ATTN	iD	Controls the gain amp. in the receivers and controls the remote attenuator assembly. In AUTO mode, the attenuators are controlled by the CP7 to obtain scale readings.	Set system attenuator to i, where $i = 0, 20, 40, 60, 80, 100, -20, -40.$
PORT	i PORT	iC	Select antenna port in a remote unit.	Select antenna port i, where $i = 1 \text{ to } 5 \text{ for Ports } 1 \text{ to } 5$ $i = 6 \text{ for Auto RE Port Select}$ $i = 7 \text{ for Auto CE Port Select}$
DWELL TIME	i DWELL TIME	iQ	Select the Peak Detector Hold time.	Set Dwell Time to i, where $i = 1 \text{ to } 255$
IMP FREQ	i IMP FREQ	iF	Set up calibration. Impulse repetition rate in remote calibrator.	Set Imp. Freq. to i, where $i = () \text{ Hz.}$ Set calibration Imp. Repetition rate to i, where $i = 0 \text{ to } 15 \text{ Repetition Rate:}$ $= \frac{32 \text{ MHz}}{2i}$

TABLE 4.1 (Cont'd)

KEY	KBOARD COMMAND	RMTE COMM.	FUNCTION	EXAMPLE
OPERATION COMMANDS				
START SCAN	START SCAN	V	This key initiates a single scan of the receivers from the starting frequency to the selected stop frequency. If the plotter is enabled, a multiband plot of the receiver data will be displayed. If this command is initiated from a remote controller device, the data from the receivers is transmitted back to the remote device. The sweep increment is one-half BW. A "999.00" followed by the starting frequency of the band, is output at the start of each band and a "999.99" is output at the end of the scan.	
STOP SCAN	STOP SCAN	X	This key is used to stop a scan that is in progress. When the key is depressed, the scan is stopped and the frequency and amplitude at each point is displayed on the LED display.	
CON- TINUE SCAN	CONT SCAN	Y	This key is used to resume a scan that was interrupted. NOTE: The continue key will always resume scan at the place it was stopped, with the same conditions at which the scan was stopped.	
REPETI- TIVE SCAN	REP SCAN	W	This key is used to select the CRT mode of operation. It causes the CP7 to do a repetitive scan from the selected start and stop freq.s.	
FIX TUNE	FIX TUNE	iU	This key sets the receivers to "i" frequency and displays the frequency and output of the detector readings on the LED display. In the remote mode, the readings are sent to the external controller device. NOTE: If only the key is struck, another reading is taken at the same frequency.	

Table 4.1, SetUp Commands Continued

KEY	KBOARD COMMAND	RMTE COMM.	FUNCTION	EXAMPLE
PLOT	i PLOT	i N	Set up plotter function.	Set plotter mode to i, where i = 0 to 3 0 for Plotter Off 1 for Plotter on 2 for Plotter Min. Cal. 3 for Plotter Max. Cal.
D/A	i D/A FIX TUNE	iLU	Lets you select any frequency in any band. used with fix tune. NOTE: This key is used in conjunction with the band key to tune receivers to an overlapping band condition.	Tune NM17/27 to 12 KHz i BAND FIX TUNE where i = 2 for Band 2. i D/A FIX TUNE where i = 12KHz
BAND	i BAND	iJU	This key is used in conjunction with D/A key.	See D/A.
AMP CAL	i AMP CAL	I	Used to calibrate the receivers. When this switch is depressed, the CP7 automatically calibrates each receiver in the system. The numbers of the receivers that have calibrated properly are displayed on the LED display.	
START FREQ	START FREQ	io	This key enters the starting sweep frequency for the single scan or repetitive scan operation.	Set start frequency to i, where i = some value between 20 Hz to 18 GHz.
STOP FREQ	STOP FREQ	iP	This key enters the stop sweep frequency for the single scan or repetitive scan operation.	Set stop frequency to i, where i = some value between 20 Hz and 18 GHz.
FUNC	FUNC	iR	This key is used to set up the CISPR/ANSI ADAPTER(CCA7)	FUNC = disable i = 0 for log/log CISPR enable i = 1 for linear/linear CISPR enable i = 2-6 for Select frequency i = 7-14 for Attenuator
RESET	RESET	Z	This key is used to reset the CP7 to its initial conditions.	
UP or DOWN	UP DOWN		These keys are used to manually tune the receivers. The time rate is adjustable by setting DWELL TIME.	

TABLE 4.2KEYBOARD CODEBinary Number

0	0	(0)
1	1	(1)
2	2	(2)
3	3	(3)
4	4	(4)
5	5	(5)
6	6	(6)
7	7	(7)
8	8	(8)
9	9	(9)
.	10	.
Hz	A	Hz
Kz	B	Kz
MHz	C	MHz
GHz	D	GHz
CE	E	CE
CW	F	CW
DET	10	DET
PORT	11	PORT
ATT	12	ATT
(-) GAIN	13	(-) GAIN
IMP FREQ	14	IMP FREQ
AMP CAL	15	AMP CAL
BAND	16	BAND
D to A	17	D to A
PLOT	18	PLOT
START FREQ	19	START FREQ
STOP FREQ	1A	STOP FREQ
DWELL TIME	1B	DWELL TIME
FIXED TUNE	1C]	FIXED TUNE
START SCAN	1D	START SCAN
CONTINUOUS SCAN	1E	CONTINUOUS SCAN
STOP SWEEP	1F	STOP SWEEP
CONTINUE SWEEP	20	CONTINUE SWEEP

- 4.1 Remote Operations. All Remote Commands to the CP7 are in the form of an ASCII character string. Each command and its function is given in Table 4.1. The CP7 has three remote I/O interfaces. These are: 1) IEEE 488/1975 Interfaces; RS232C Interface ports; and an 8-bit parallel I/O port.
- 4.1.1 IEEE 488/1975 Interface signals are on J . An adapter cable is used to provide the system connector interface. (See Figure 4.3) The following functions are implemented:
- Source Handshake
 - Acceptor Handshake
 - Talker function
 - Listener function
 - Device clear function

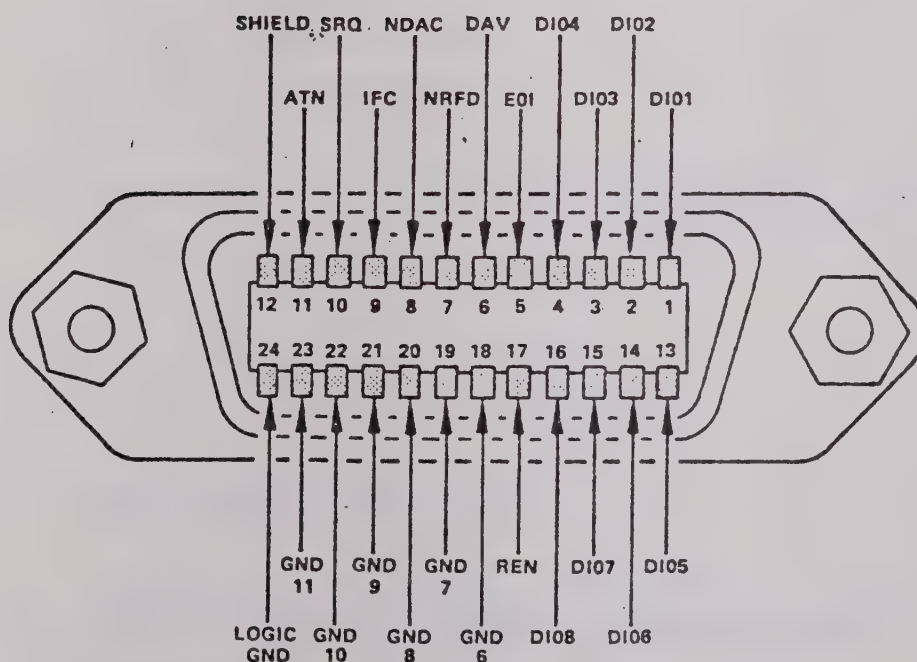


Figure 4.3

4.1.1.1 Bus Cabling. In order to ensure proper operation of the bus, two rules must be observed regarding the total length of the bus cables when they are connected together:

- a. The total length of the cable permitted in one bus system must be less than or equal to two meters times the number of devices connected together;
- b. The total length of cable must not exceed 20 meters.

4.1.1.2 Bus Signal Lines. The bus consists of sixteen signal lines that are defined as follows:

1. D101 Data Input/Output 1
- ⋮
8. D108 Data Input/Output 8
9. DAV Data Valid
10. NRFD Not Read for Data
11. NDAC Data Not Accepted
12. IFC Interface Clear
13. ATN Attention
14. SRQ Service Request
15. REN Remote Enable
16. EOI End or Identify

4.1.1.3 Logic Levels. All signals use negative-true logic: high more than 2.4 V; low less than 0.4 V. The bus structure is organized into three sets of signal lines:

- a. Data Bus -- 8 lines;
- b. Handshake or Control -- 3 lines;
- c. Interface Management -- 5 lines.

4.1.2 RS232C Interface signals are on J .

4.1.3 CP7 16-bit I/O Port Interface signals are on J . The CP7 16-bit I/O port provides the capability of interfacing the CP7 through a 16-bit interface. The interface consists of:

16 input data lines	IDO-ID15
16 output data lines	OD6-OD15
1 output strobe line	IS-
1 output strobe link	OS-
CP7 ready line	RDY-

(4.1.3.1 Cont'd)

All interface lines are TTL. Comparable logic 0 = $.2V \pm .2$ volts. Logic 1 = $3.0V \pm .4$ volts. See Table 4.3 for pin configuration.

4.1.3.2 Input Timing. The input data lines are used to transmit data from the control device to the CP7. The RDY- line in a Logic 1 state indicates the CP7 is ready to accept data. The IS- line is used to strobe the data on the input lines into the CP7. See Figure 4.4.

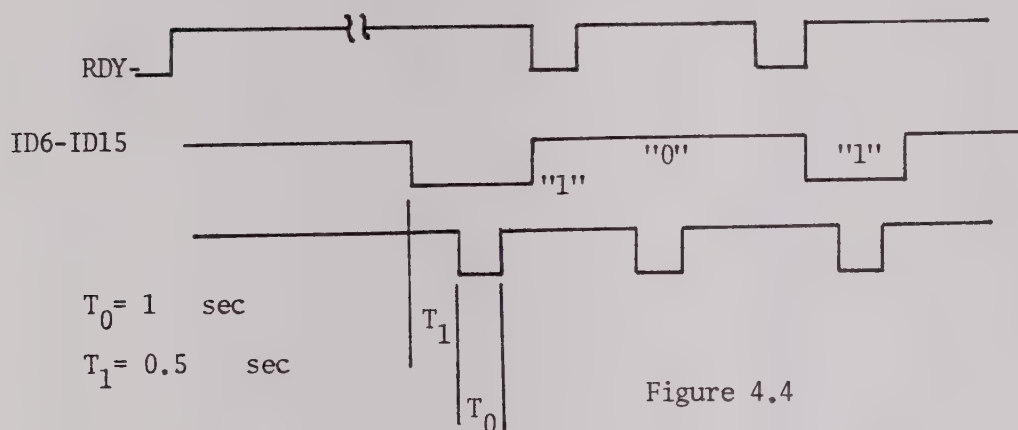


Figure 4.4

4.1.3.3 Output Timing. The output data lines are used to transmit data from the CP7 to the control device. See Figure 4.5

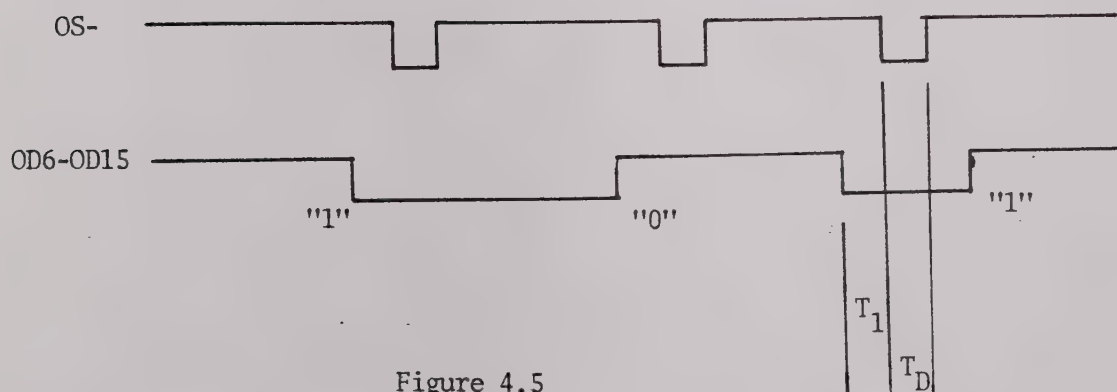


Figure 4.5

4.1.3.4 Data Format. All I/O data is 7-bit ASCII coded.

TABLE 4.3
PIN CONFIGURATION

<u>RS232C</u>		<u>8-BIT I/O</u>	
<u>Connector Pin</u>	<u>Function</u>	<u>Connector Pin</u>	<u>Function</u>
J20A	TX	J20G	CA1
J20B	RX	J20H	OUT 1
J20C	COM	J20J	OUT 2
J20D	COM	J20K	OUT 3
J20E	COM	J20L	OUT 4
J20F	PTC	J20M	OUT 5
		J20N	OUT 6
		J20P	OUT 7
		J20R	OUT 8
		J20a	READY
		J20b	IN 1
		J20c	IN 2
		J20d	IN 3
		J20e	IN 4
		J20f	IN 5
		J20g	IN 6
		J20h	IN 7
		J20i	IN 8
		J20t	ENTER
		J6	SCOPE (Y)
		J	COM
		J4	AUX OUT
		J	COM

V. THEORY OF OPERATION

5.0 Introduction. This section of the manual contains the theory of operation of the Model CP7 Programmer. The information is related to the simplified block diagram contained in the section. See Figure 5.1.

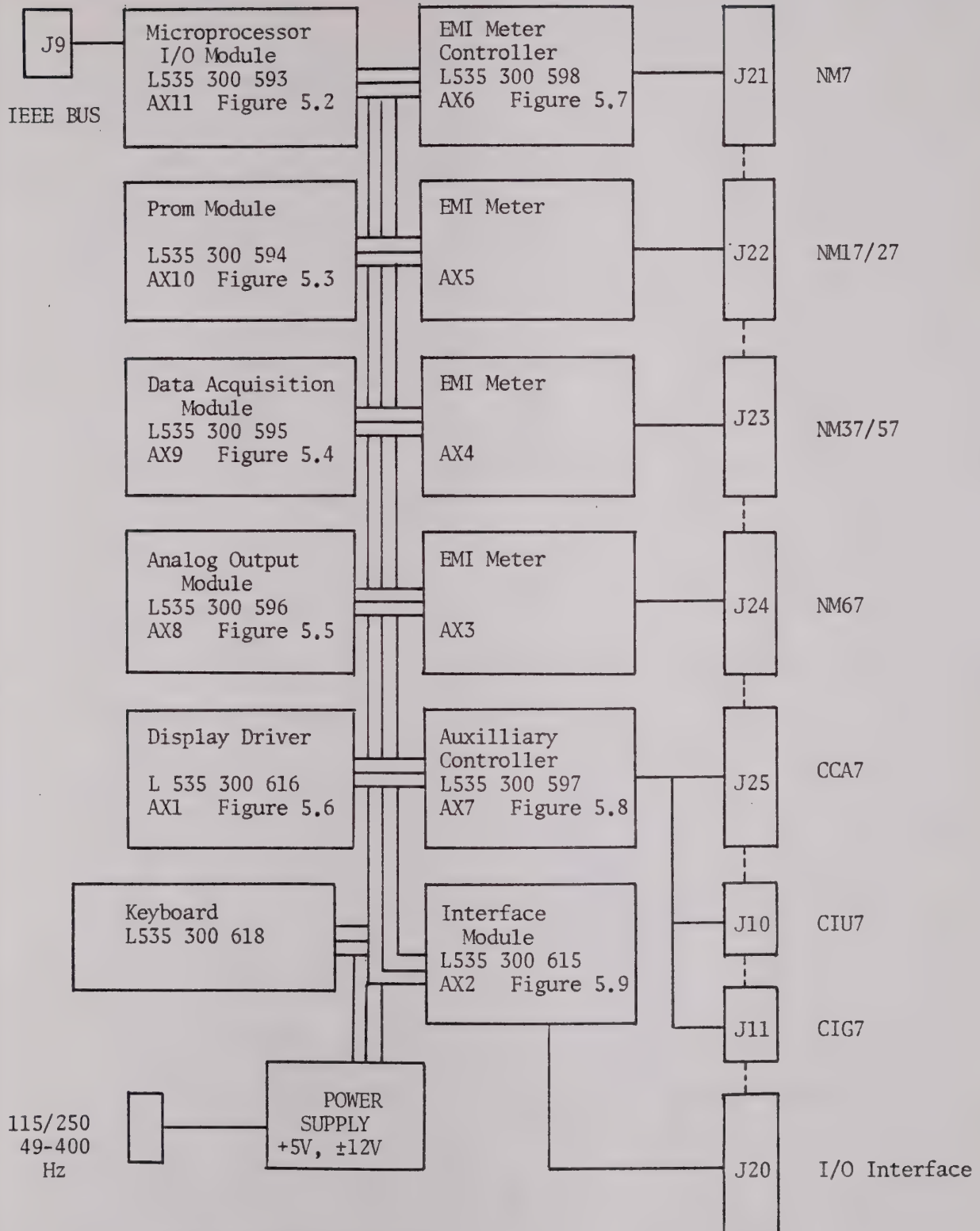
5.1 Basic Principles of Operation.

5.1.1 The Model CP7 Programmer is capable of controlling up to four separate EMI/FI Meters covering the frequency range of 20 Hz to 18 GHz. * . Each EMI/FI Meter is divided into either 8 bands, 7 bands ** or one band, with a total of 24 bands for all four EMI/FI meters.

5.1.2 The operator of the Model CP7 Programmer can also control the bandwidth and detector functions of the four EMI/FI meter. The calibration function of the EMI/FI meters is automatically set by the Model CP7. The Model CP7 controls a remote attenuator antenna switch (Input Unit Model CIU-7A). The Model CP7 Programmer multiplexes several outputs from the EMI/FI meters, digitizing only the signal from the EMI/FI meter selected.

5.1.3 The following block diagrams are supplied:

<u>No.</u>	<u>TITLE</u>	<u>Librascope No.</u>
Figure 5.1	Simplified Block Diagram	
Figure 5.2	MPU Module AX11	L535 300 593
Figure 5.3	Prom Module AX10	L535 300 594
Figure 5.4	Data Acquisition Moduel AX9	L535 300 595
Figure 5.5	Analog Output Module AX8	L535 300 596
Figure 5.6	Display Driver AX1	L535-300 616
Figure 5.7	EMI Meter Controller AX6-AX3	L535 300 598
Figure 5.8	Auxilliary Controller AX7	L535 300 597
Figure 5.9	Interface Module AX2	L535 300 615



SINGER
LIBRASCOPE DIVISION

SIMPLIFIED BLOCK DIAGRAM

DRAWN SEE PAGE 1

SIZE

A

FSCM NO.

36090

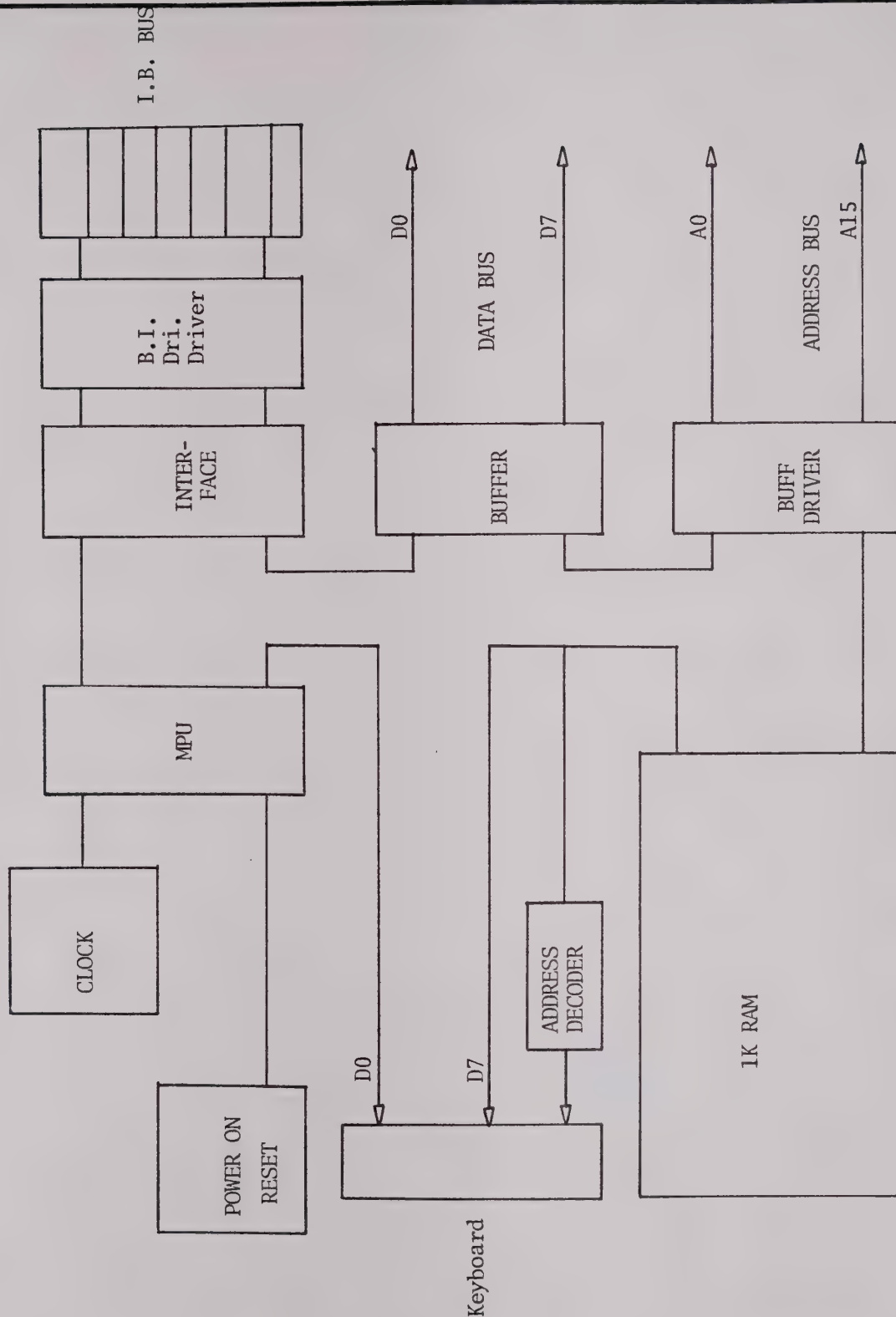
DWG NO.

FIGURE 5.1

ISSUED SEE PAGE 1

SCALE

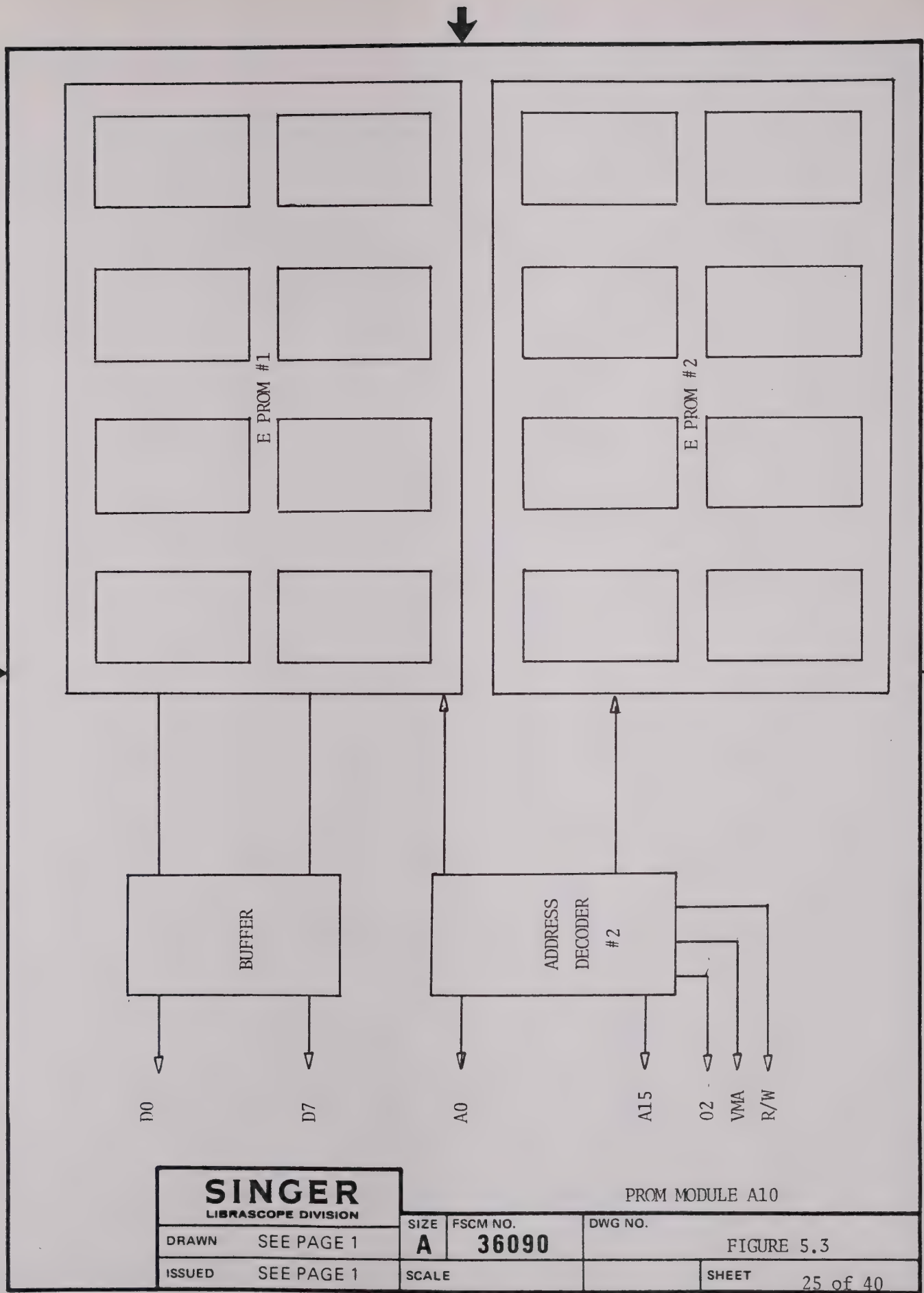
SHEET 23 of 40



SINGER	
LIBRASCOPE DIVISION	
DRAWN	SEE PAGE 1
ISSUED	SEE PAGE 1

MPU MODULE A11

SIZE	FSCM NO.	DWG NO.
A	36090	FIGURE 5.2
SCALE	SHEET	
	24 of 40	



SINGER
LIBRASCOPE DIVISION

PROM MODULE A10

DRAWN SEE PAGE 1

SIZE

A

FSCM NO.

36090

DWG NO.

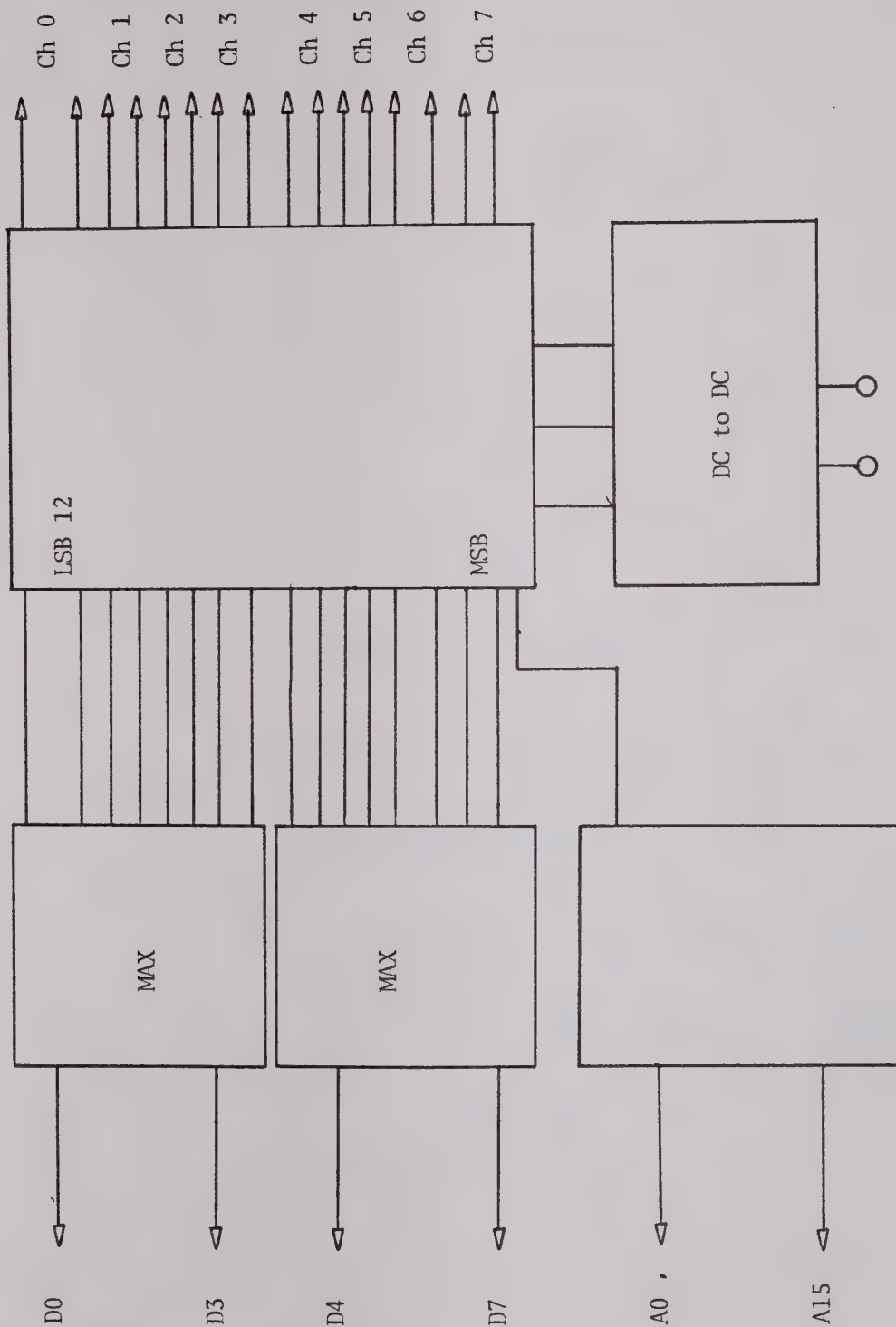
FIGURE 5.3

ISSUED SEE PAGE 1

SCALE

SHEET

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SINGER
LIBRASCOPE DIVISION

A 9 DATA ACQUISITION MODULE

DRAWN SEE PAGE 1

SIZE

A

FSCM NO.

36090

DWG NO.

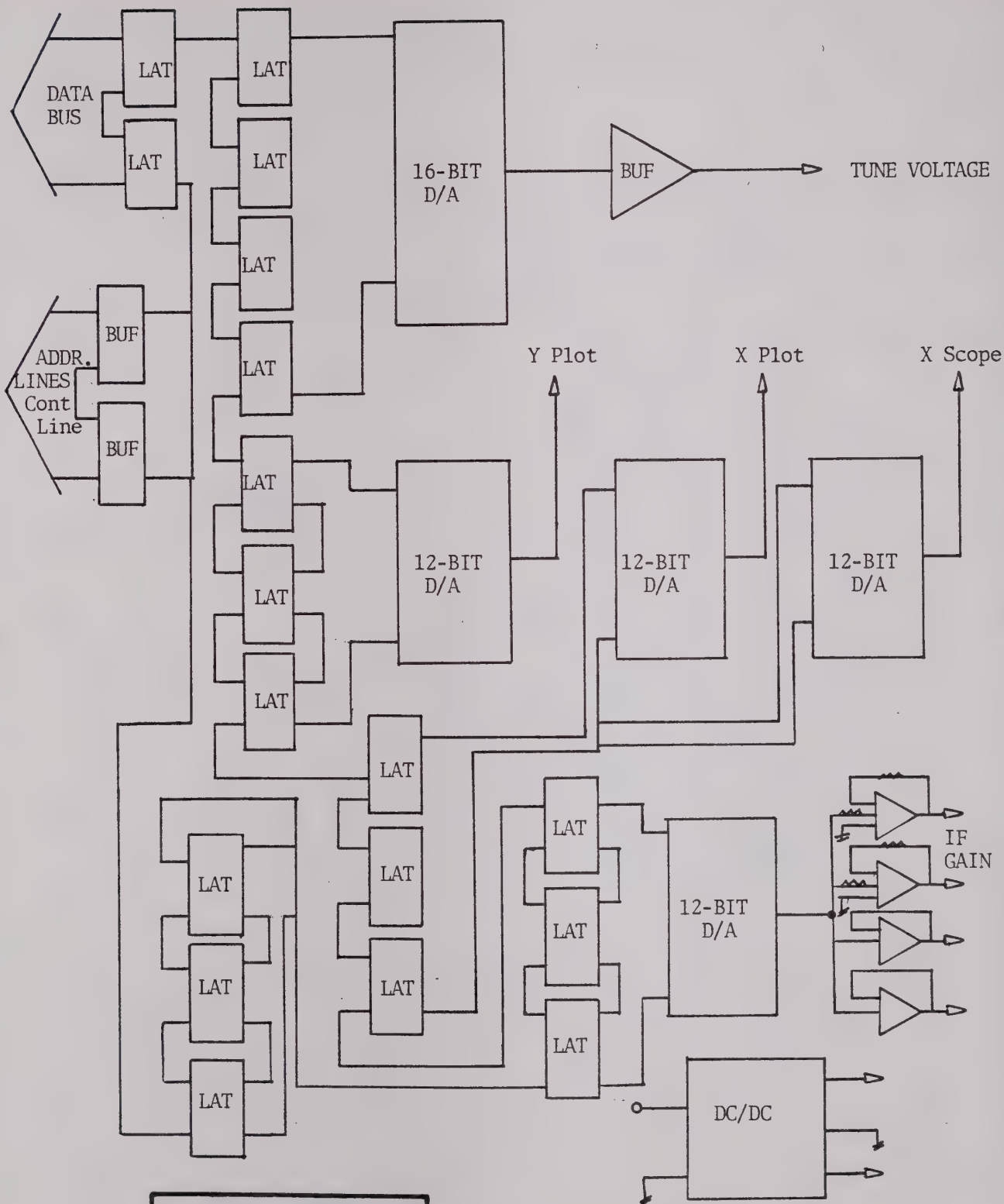
FIGURE 5.4

ISSUED SEE PAGE 1

SCALE

SHEET

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SINGER
LIBRASCOPE DIVISION

CP7 Card #4 D/A

DRAWN SEE PAGE 1

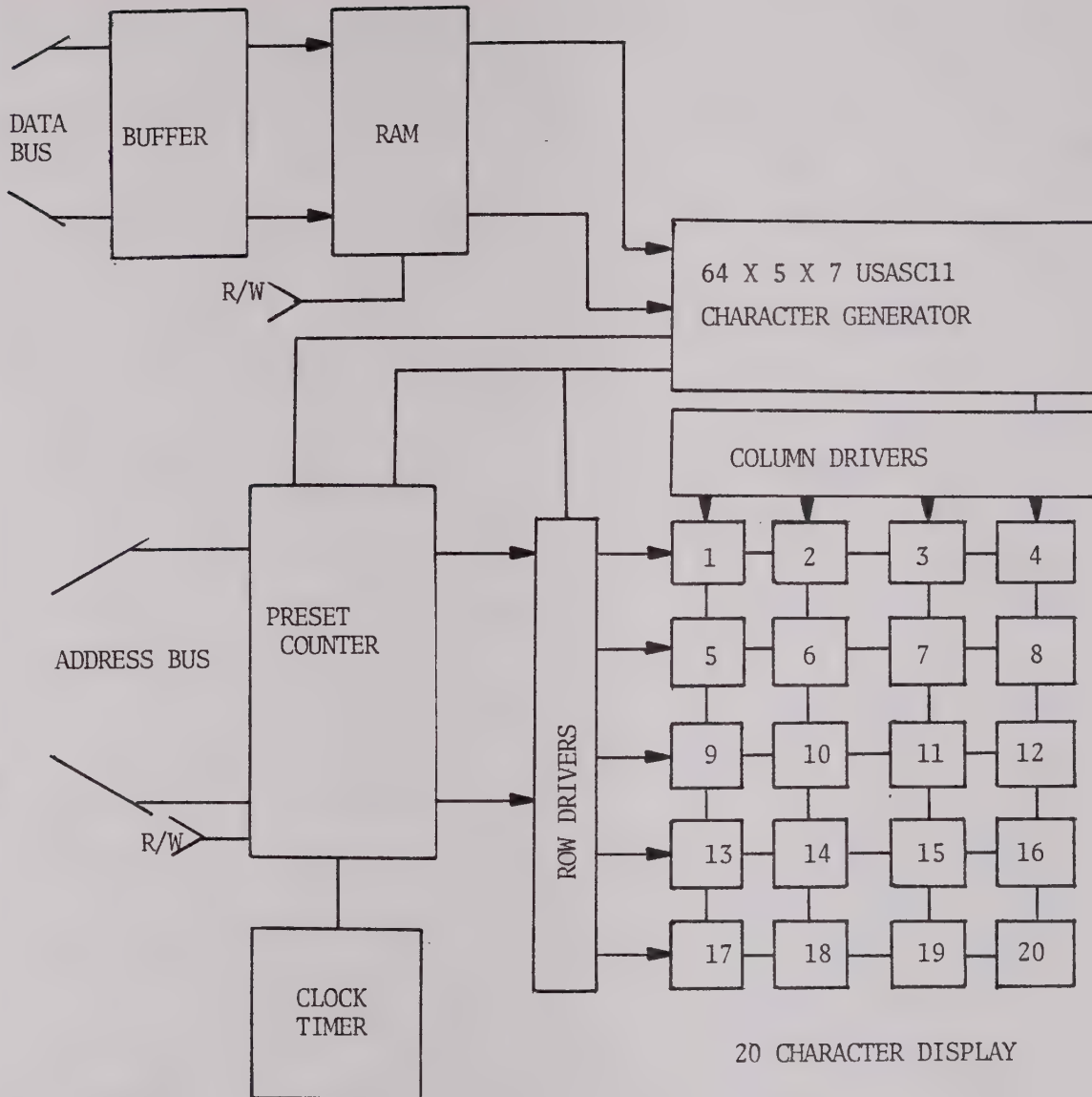
SIZE **A** FSCM NO. **36090**

DWG NO. Figure 5.5 ANALOG OUTPUT

ISSUED SEE PAGE 1

SCALE

SHEET 27 of 40



SINGER
LIBRASCOPE DIVISION

DISPLAY AND DRIVER

DRAWN SEE PAGE 1

SIZE
A

FSCM NO.
36090

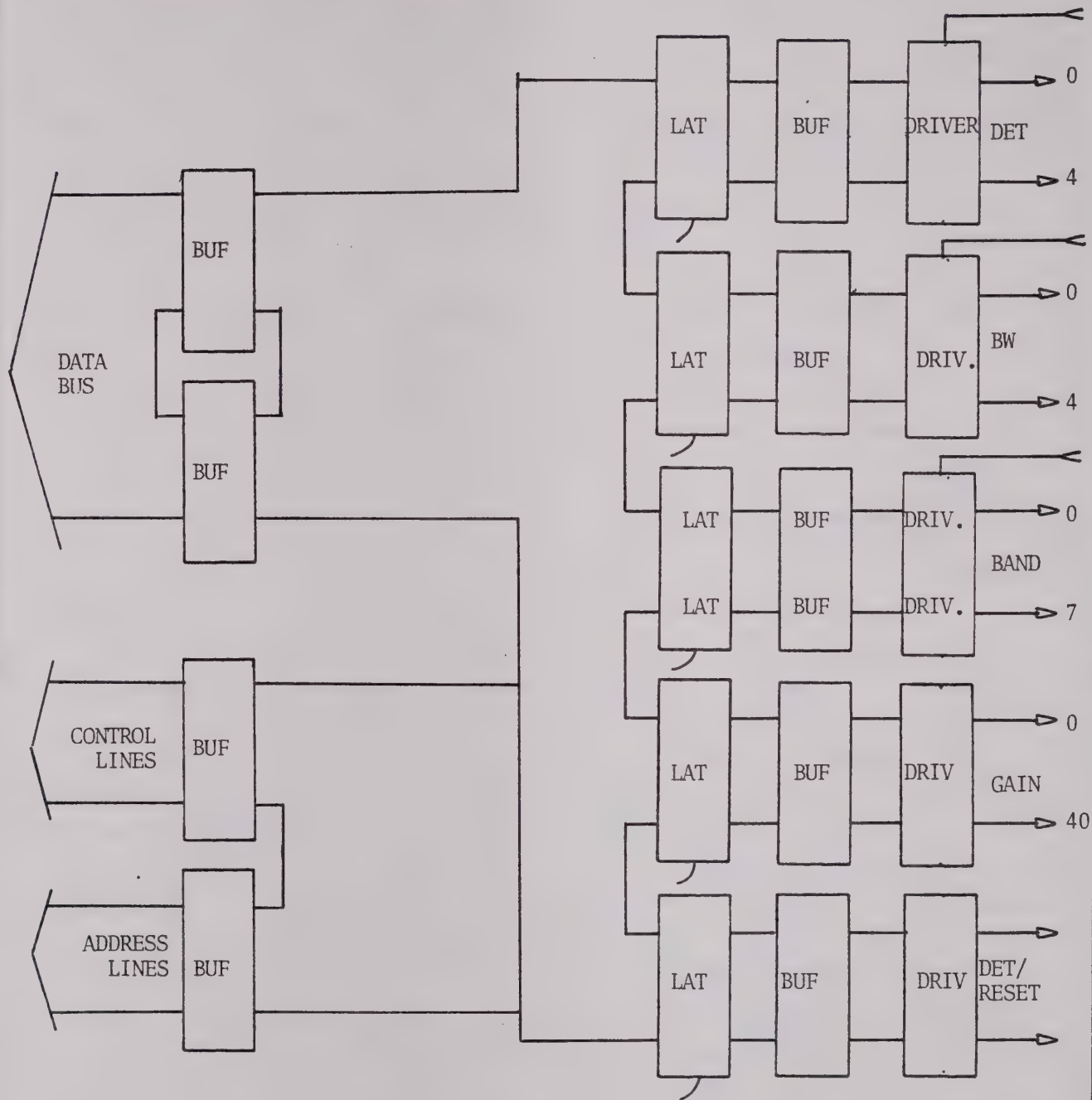
DWG NO.

Figure 5.6

ISSUED SEE PAGE 1

SCALE

SHEET 28 of 40



SINGER
LIBRASCOPE DIVISION

CP7A CARD #6-9/ RECEIVER DRIVER

DRAWN SEE PAGE 1

SIZE

A

FSCM NO.

36090

DWG NO.

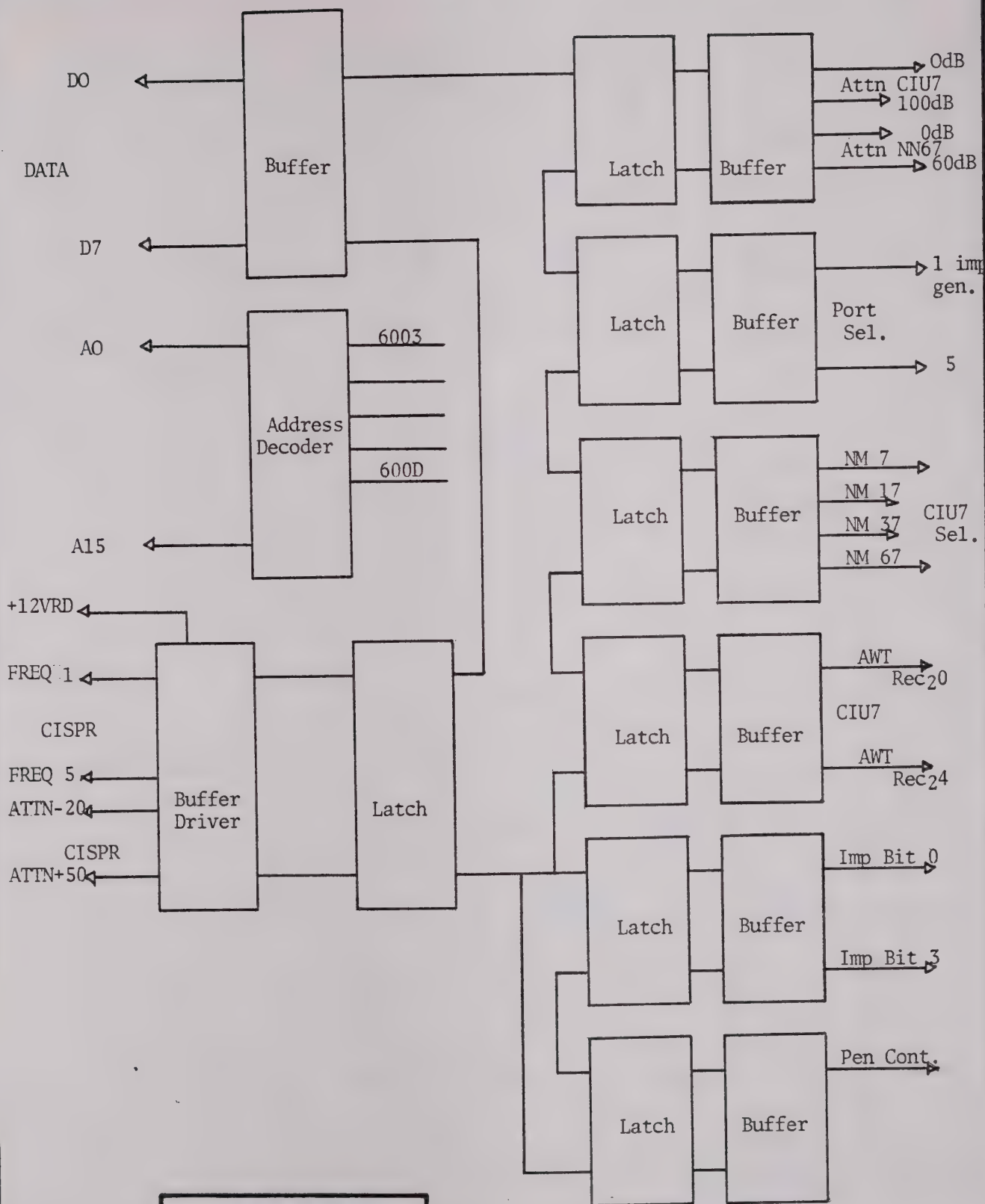
EMI METER CONTROLLER
FIGURE 5.7

ISSUED SEE PAGE 1

SCALE

SHEET

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SINGER

LIBRASCOPE DIVISION

DRAWN SEE PAGE 1

ISSUED SEE PAGE 1

SIZE

A

FSCM NO.

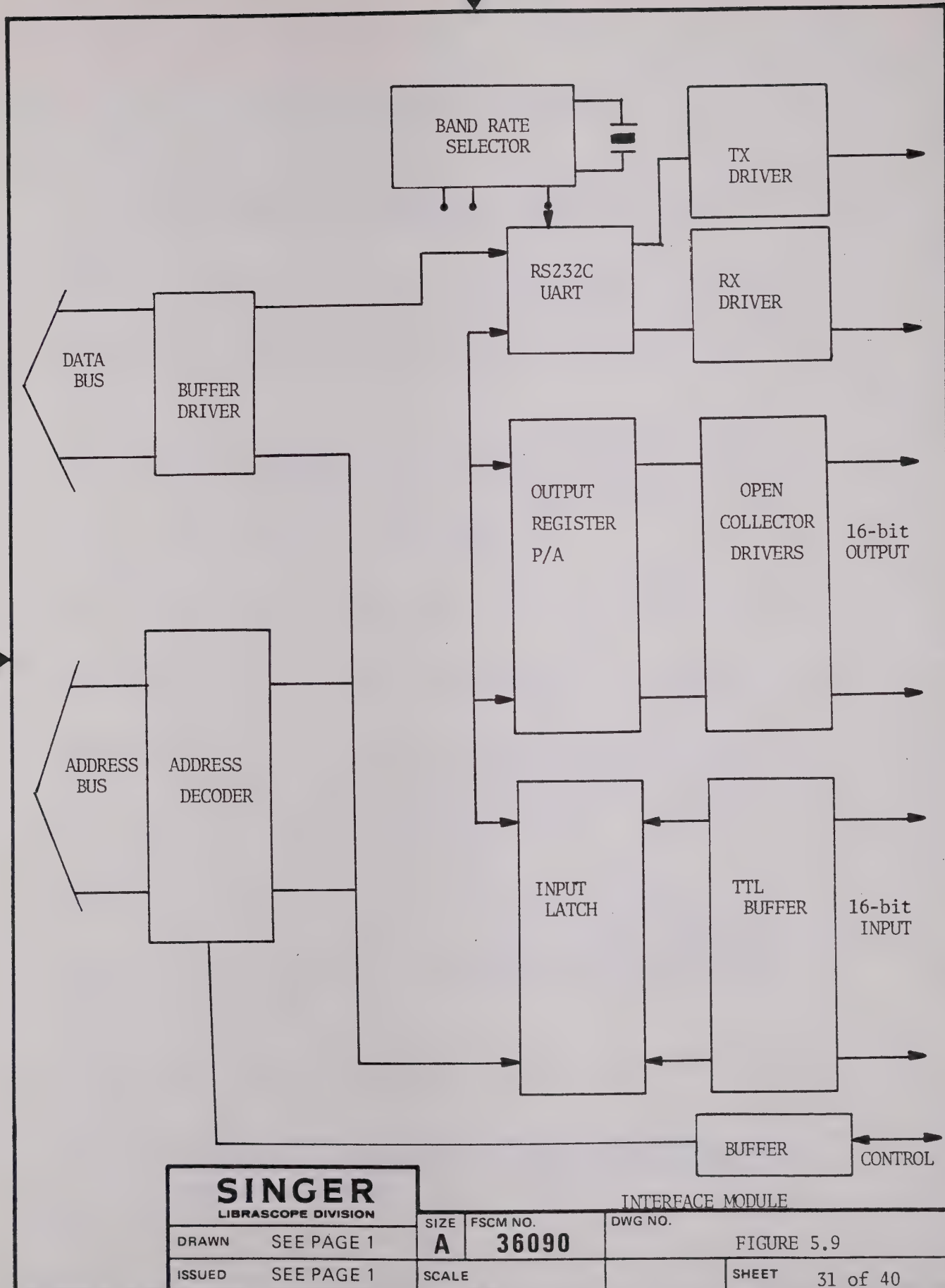
36090

DWG NO.

AUX CONTROLLER A5/Figure 5.8

SCALE

SHEET 30 of 40



SINGER		INTERFACE MODULE		
LIBRASCOPE DIVISION		SIZE	FSCM NO.	DWG NO.
DRAWN	SEE PAGE 1	A	36090	FIGURE 5.9
ISSUED	SEE PAGE 1	SCALE		SHEET 31 of 40

VI. CALIBRATION / MAINTENANCE

- 6.1 Calibration of Tune Voltage. The A8 board is calibrated through the use of the program (DAC 16-A) calibration offset.
- 6.1.1 Calibration is performed by connecting a five digit DVM which is capable of $\pm 0.005\%$ accuracy to connector J67, Pin L. Voltage reading should be 0.000 V. Zero offset adjustment. Pot. R10. Reference Figure L535 300 596.
- 6.1.2 Calibration program DAC 16-B is used to calibrate full scale output. Repeat the above procedure, but adjust the gain control for the most positive full scale output. +10.240 VDC, Pot. R20. Reference Figure L 535 300 596.
- 6.1.3 Repeat this procedure, 6.1.1 and 6.1.2, until offset and gain are to electrical specifications.
- 6.2 Calibration of IF Gain Voltage A8 Card. Program DAC-IF:A is used.
- 6.2.1 Calibration is performed by connecting a five digit DVM which is capable of $\pm 0.005\%$ accuracy to connector J7 pin; voltage reading should be -10.000 V zero offset adjustment. Pot. R30. Reference Figure L 535 300 596.
- 6.2.2 Calibration program DAC-IF:B is used to calibrate full scale output. Connect the DVM to J67, Pin j. Use gain control adjustment. Voltage reading should be +9.995 VDC. Reference Pot. RA), Figure L535 300 596.
- 6.2.3 Repeat these procedures, 6.2.1 and 6.2.2, until offset and gain are to electrical specifications.
- 6.3 Calibration of X-Axis for X-Y Recorder and CRT Display A8 Card. Program DAC (X-AXIS-0).

- 6.3.1 Calibration is performed by connecting a five digit DVM accuracy of $\pm 0.005\%$ to X-axis for X-Y recorder. Voltage reading should be 0.000 V. Zero offset should be adjusted. Pot. R50, Figure
- 6.3.2 Calibration program (DAC X-axis full scale) is used to adjust full scale gain. Pot. R60, L535 300 596 . Voltage reading should be +4.998.
- 6.3.3 Repeat these procedures, 6.3.1 and 6.3.2, until offset and gain are to electrical specifications.
- 6.4 Calibration Y-Axis for X-Y Recorder and CRT Display A8 Card Program.
(DAC Y-Axis-0).
- 6.4.1 Calibration is performed by connecting a five digit DVM accuracy of $\pm 0.005\%$ to Y-axis for X-Y recorder. Adjust Pot. R60, Fig. L535 300 -596 . Connect the DVM to Y-axis for CRT display. Adjust Pot. R70, L535 300 596. Voltage reading should be 0.000 VDC.
- 6.4.2 Calibration program (DAC Y-Axis full scale) is used to adjust full scale gain. Pot. R80 is used to adjust X-Y recorder full scale voltage +4.998 VDC. Pot. R90 is used to adjust full scale gain for Y output for CRT display. Voltage reading should be +4.99 VDC.
- 6.4.3 Repeat these procedures, 6.4.1 and 6.4.2, until offset and gain are to electrical specifications.

VII. LIST OF PARTS

- 7.1 M68MM01 (D) -- Monoboard Microcomputer 1.
- 7.2 M68MM04 (D) -- 8K16K AROM/ROM Module.
- 7.3 M68MM0SA -- 8 Channel 12-bit A/D Module.
- 7.4 M68MM0SC -- 4 Channel 12-bit D/A Module.
- 7.5 M68MMCC10 -- Card Cage Specification.
- 7.6 12SW2SERIES1 -- Keyboard Specification.
- 7.7 HDBB -- 10SW Power One Specifications.
- 7.8 DE/200 Display Description.
- 7.9 40S1 Graphic System Reference IEEE Standard Number 488/1975.
- 7.10 1-500783-257 VII Series System Programmer.
- 7.11 Front Panel.

A. Hardware:

- 1. (30) Keyboard Switch
- 2. (1) Signal Switch
- 3. (1) 20 Character Display
- 4. (2) Circuit Boards
- 5. (1) Assembly Plate
- 6. (1) Front Cover
- 7. (1) Wire Harness

B. Electrical Diagram:

- 1. Keyboard Decoder
- 2. Display Control
- 3. Wire Harness Pin Data

7.12

Back Panel.

A. Hardware:

1. (6) 41-pin Connectors
2. (16) B.N.C. Connectors
3. (3) 19-pin Connectors
4. (1) Fuse Holder
5. (1) 3-pin Receptacle
6. (2) Microphone Jacks
7. (1) Wire Harness

B. Electrical Diagram:

1. Power Supply Circuitry
2. Program Pin Data
3. Antenna and Attenuator Pin Data

7.13

Card Cage.

A. Hardware:

1. (1) 10-Card Cage
2. Microprocessor I/O Module
3. PROM Module
4. Data Acquisition Module
5. Analog Output Module
6. Auxiliary Controller
7. EMI Meter Controller
8. Interface Module

7.13 Cont'd

B. Electrical Diagram:

1. Back Plain
2. Microprocessor I/O Module
3. PROM Module
4. Data Acquisition Module
5. Analog Output Module
6. Auxiliary Controller
7. EMI Meter Controller
8. Interface Module

7.14 Materials. See Table 7.1

MATERIALS

<u>ITEM</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MANUFACTURER</u>
1	M.P.U	M68MM01	Motorola
2	MEM	m68MM04	Motorola
3	A/D	M68MM0SA	Motorola
4	D/A	M68MM0SC	Motorola
5	Wire Wrap	MEX68WW	Motorola
6	Card Card	M68MMCC10	Motorola
7	Card Card	M68MMCC5	Motorola
8	Keyboard	12SW3-19	Micro Switch
9	Switch	101SW11	Micro Switch
10	Button	2SW603-1	Micro Switch

Table 7.1 Cont'd

<u>ITEM</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MANUFACTURER</u>
11	Display	DE/200	Digital Elect.
12	Display	Power Supply	Digital Elect.
13	Power Supply	HDBB-10SW	Power - One
14	D/A 16-bit	DAC70-CSB-I	Burr Brown
15	Oper. Amp.	BB3S00C	Burr Brown
16	Buffer Amp .	BB3329	Burr Brown
17	DC to DC	BB Model 546	Burr Brown
18	Log Amp.	BB4127JG	Burr Brown
19	Connector	KPTM02A20-41P	ITT
20	Connector	KPTM02A14-19P	ITT
21	BNC Connector	UG1094A/U	King Elect.
22	Jack Phone Connector	13B	Switchcraft
23	Wire Wrap Socket	316-AG36F	Augut
24	Wire Wrap Socket	314-AG36F	Augut
25	Pin Terminals	314-17PS	Augut
26	Cable Assembly	25-65-48	3M
27	IC	SN74LS175N	TI
	IC	74LS174	TI
	IC	7407	TI
	IC	7406	TI
	IC	74LS00	TI
	IC	74LS138	TI
	IC	74LS04	TI
	IC	74S04N	TI
	IC	74LS21	TI
	IC	74LS74	TI
	IC	74LS32	TI
	IC	74148	TI
	IC	Q2T2222	TI
	IC	N8T97B	Signetics
	IC	N8T26B	Signetics

IX. WIRING HARNESS LISTING

CP7

OPERATOR'S HANDBOOK

L 191 000 650

SINGER

LIBRASCOPE DIVISION

		SIZE	FSCM NO.	DWG NO.	
DRAWN	SEE PAGE 1	A	36090	L 541 003 466	
ISSUED	SEE PAGE 1	SCALE			SHEET 39 of 40

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
L200 024705	CP7				

SECTION 1

WIRING HARNESS LISTING

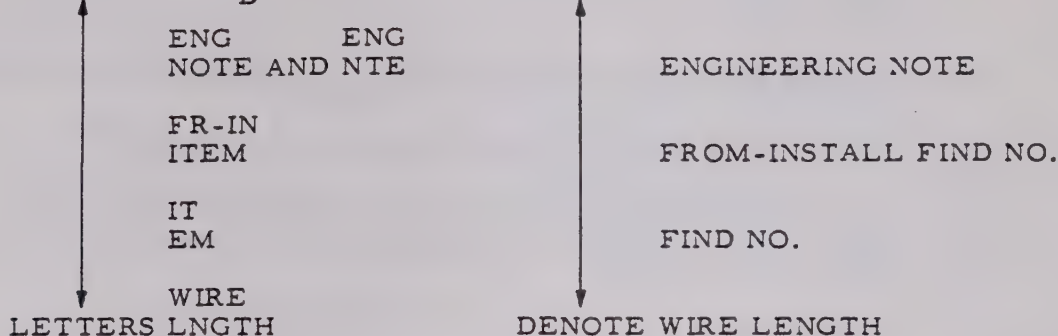
CONTENTS AND SHEET DESIGNATIONS			
SECTION 1 WIRING HARNESS	COVER SHEETS 1-1 THRU 1-6	EDP LISTING SH 1 THRU 9	SHEETS TOTAL 34
SECTION 2 WIRING DIAGRAM	COVER SHEET 2-1	EDP LISTING SH 1 THRU 18	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DIMENSIONS DECIMAL ANGULAR 2 PLACE ± .02 ±1° 3 PLACE ± .010 4 PLACE ± .0005 DO NOT SCALE THIS DRAWING	DR. <i>[Signature]</i> 9-12-77 CHK <i>[Signature]</i> APPD <i>[Signature]</i> 7/19/77	SINGER GLENDALE, CA. 91201 LIBRASCOPE DIVISION			
		WIRING HARNESS, CP 7 ASSEMBLY			
	MATERIAL	SIZE	CODE IDENT NO.	DWG NO.	
		A	36090	L541003466	
		SCALE	SHEET 1-1 OF 34		

NOTES:

1. PREPARED IN ACCORDANCE WITH MIL-STD-100
2. MIL-STD-12 APPLIES EXCEPT AS FOLLOWS:

LETTERS CD, ^C/_D, AND CLR CDE DENOTE CODE



LETTERS IN A CODE COLUMN ON EDP LISTING SHALL BE INTERPRETED AS FOLLOWS:

LETTER A DENOTES CABLE, SHIELDED
 B BLACK
 R RED
 T CABLE, TWISTED
 W WHITE

LETTER C DENOTES COAXIAL (RADIO FREQUENCY)

THE ALPHA "AA", "BB", ETC. SHOWN IN THE SHLD GRP COLUMN INDICATE THE SHIELDS ARE COMMON AND ARE TIED TOGETHER IN A BUTT SPLICE. EACH ALPHA INDICATES A DIFFERENT SHIELD GROUP

() PRECEEDING A WIRE NO. DENOTES A JUMPER WIRE

(*) PRECEEDING A LETTER DENOTES A LOWER CASE LETTER

3. TOLERANCE ON WIRE LENGTHS: +5 PCT
4. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQ 5
5. PARTIAL REF DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH

SINGER			
LIBRASCOPE DIVISION			
DRAWN	SEE PAGE 1	SIZE	FSCM NO.
ISSUED	SEE PAGE 1	A	36090
		DWG NO.	1541003466
		SCALE	SHEET 1-3
		REV	

- ↓
6. MARK WIRE NUMBERS AT 4 INCH MAX INTERVALS ON ALL WIRES LONGER THAN 4 INCHES USING WIRE MARKING FOIL PER MIL-M-81594, TYPE AS APPLICABLE
 7. MARK BAND MARKERS, FIND NO. 12 WITH .09 HIGH CHARACTERS USING WIRE MARKING FOIL PER MIL-M-81594, TYPE VI. SEE FIGURE 1
 8. TWIST WIRES, OF LINK WIRE NO. WITH DIFFERENT COLOR TOGETHER WHERE THEY RUN PARALLEL
 9. WIRING PROCEDURE PER MIL-STD-454, REQ T 69
 10. MARK CONNECTOR REF DESIGNATIONS ON BAND MARKER USING WIRE MARKING FOIL PER MIL-M-81594 TYPE VI. AFFIX TO HARNESS
 11. REFERENCES:
 - A. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO.
 - B. MECHANICAL ASSEMBLY
DWG NO. L200 024705

SINGER LIBRASCOPE DIVISION		SIZE	FSCM NO.	DWG NO.	REV
		A	36090	<u>L541003466</u>	
DRAWN	SEE PAGE 1	SCALE		SHEET <u>1-4</u>	
ISSUED	SEE PAGE 1				

LIST OF MATERIAL

ITEM	REQD	PART NO.		DESCRIPTION
1	A/R	L100000687	M81044/12-24-9	WIRE ELEC AWG 24 WHT
2	A/R	L100000685	M81044/12-24-0	WIRE ELEC AWG 24 BLK
3	276	3184849-1		CONTACT ELEC
4	3	3184848		CONNECTOR ELEC P1, 2, 3
5	3	3184851-1		JACKSCREW ASSY
6	6	T520027202		CONNECTOR ELEC J20 THRU J25
7	3	T520027201		J9 THRU J11
8	2	L520011340	CN13B	J3, J7
9	1	L520011339	6J4	J8
10	13	L520004608	UG1094 A/U	J1, 2, 4, 5, 6, 12-19
11	1	L520011331		CONNECTOR ELEC J26
12	4	L336003371	MS3368-1-9A	STRAP IDENT
13				
14				
15	A/R	T100500625	2846619-25	WIRE ELEC AWG 16 WHT
16	A/R	T100500627	2846619-27	WIRE ELEC AWG 20 WHT
17	1	L540000406	MS25036-145	TERMINAL LUG
18	28	H947902005	MS25036-102	TERMINAL LUG

SINGER

LIBRASCOPE DIVISION

DRAWN SEE PAGE 1

ISSUED SEE PAGE 1

SIZE

A

FSCM NO.

36090

DWG NO.

L541003466

SCALE

SHEET 1-5

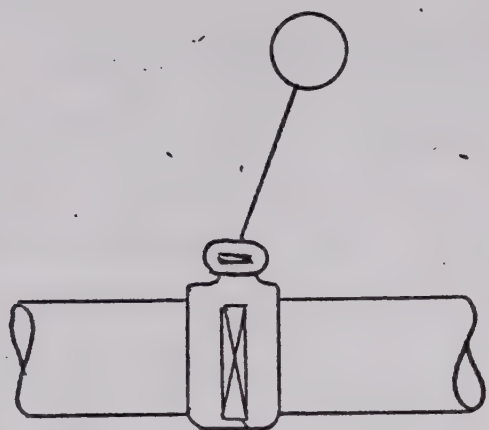


FIG 1

.09 IDENT
SEE NOTE 7 & 10

L541003466

P1

P2

P3

SINGER LIBRASCOPE DIVISION		SIZE	FSCM NO.	DWG NO.
DRAWN	SEE PAGE 1	A	36090	L541003466
ISSUED	SEE PAGE 1	SCALE		SHEET 1-6

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0000		*			P3	A14	03	J26	001			
0001		01	024		P3	B07	03	J09		A		
0002		01	024		P3	B08	03	J09		B		
0003		01	024		P3	B09	03	J09		C		
0004		01	024		P3	B10	03	J09		D		
0005		01	024		P3	B11	03	J09		E		
0006		01	024		P3	B12	03	J09		F		
0007		01	024		P3	B13	03	J09		G		
0008		01	024		P3	B14	03	J09		H		
0009		01	024		P3	C08	03	J09		J		
0010		01	024		P3	C09	03	J09		K		
0011		01	024		P3	C05	03	J09		L		
0012		01	024		P3	C12	03	J09		M		
0013		01	024		P3	C11	03	J09		N		
0014		01	024		P3	C10	03	J09		P		
0015		01	024		P3	C07	03	J09		R		
0016		01	024		P3	C06	03	J09		S		
0017		01	024		P3	C13	03	J09		T		
0018		01	024		P3	C14	03	J09		U		
0019		01	024		P3	D01	03	J09		V		
0020		01	024		P3	F02	03	J25		Z		
0021		01	024		P3	F03	03	J25		*T		
0022		01	024		P3	F06	03	J25		A		
0023		01	024		P3	F07	03	J25		B		
0024		01	024		P3	F08	03	J25		C		
0025		01	024		P3	E06	03	J25		D		
0026		01	024		P3	E07	03	J25		E		
0027		01	024		P3	F11	03	J25		F		
0028		01	024		P3	F12	03	J25		G		
0029		01	024		P3	F13	03	J25		H		
0030		01	024		P3	F14	03	J25		J		
0031		01	024		P3	F15	03	J25		K		
0032		01	024		P3	F18	03	J25		L		
0033		01	024		P3	F17	03	J25		M		
0034		01	024		P3	G05	03	J25		N		
0035		01	024		P3	F16	03	J25		P		

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0036	01	024	P3	G06	03	J25	*A					
0037	01	024	P3	G07	03	J25	*B					
0038	01	024	P3	G08	03	J25	*T					
0039	01	024	P3	G09	03	J10	A					
0040	01	024	P3	G10	03	J10	B					
0041	01	024	P3	G11	03	J10	C					
0042	01	024	P3	G12	03	J10	D					
0043	01	024	P3	G13	03	J10	E					
0044	01	024	P3	G14	03	J10	F					
0045	01	024	P3	H05	03	J10	G					
0046	01	024	P3	H06	03	J10	H					
0047	01	024	P3	H07	03	J10	J					
0048	01	024	P3	H08	03	J10	K					
0049	01	024	P3	H09	03	J10	L					
0050	01	024	P3	H10	03	J10	M					
0051	01	024	P3	H11	03	J10	N					
0052	01	024	P3	H12	03	J10	P					
0053	01	024	P3	H13	03	J10	R					
0054	01	024	P3	D08	03	J10	V					
0055	01	024	P3	H14	03	J11	A					
0056	01	024	P3	D05	03	J11	C					
0057	01	024	P3	D06	03	J11	E					
0058	01	024	P3	J07	03	J11	G					
0059	01	024	P3	J08	03	J11	K					
0060	01	024	P3	J09	03	J11	M					
0061	01	024	P3	J10	03	J11	N					
0062	01	024	P3	J11	03	J11	P					
0063	01	024	P3	J12	03	J11	R					
0064	01	024	P3	J13	03	J11	S					
0065	01	024	P3	F05	03	K1	X2					
0066	01	024	P2	A10	03	J21	A					
0067	01	024	P2	A11	03	J21	B					
0068	01	024	P2	A12	03	J21	C					
0069	01	024	P2	A13	03	J21	D					
0070	01	024	P2	A14	03	J21	E					
0071	01	024	P2	R05	03	J21	F					

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0072		01	024		P2	C07	03		J21	G		
0073		01	024		P2	B06	03		J21	H		
0074		01	024		P2	A05	03		J21	J		
0075		01	024		P2	B07	03		J21	K		
0076		01	024		P2	C12	03		J21	L		
0077		01	024		P2	B09	03		J21	M		
0078		01	024		P2	B08	03		J21	N		
0079		01	024		P2	B10	03		J21	P		
0080		01	024		P2	B11	03		J21	S		
0081		01	024		P2	C13	03		J21	U		
0082		01	024		P2	B12	03		J21	W		
0083		01	024		P2	B13	03		J21	X		
0084		01	024		P2	C10	03		J21	Y		
0085		01	024		P2	B14	03		J21	Z		
0086		01	024		P2	A09	03		J21	*A		
0087		01	024		P2	A08	03		J21	*D		
0088		01	024		P2	A07	03		J21	*F		
0089		01	024		P2	A06	03		J21	*G		
0090		01	024		P2	C05	03		J21	*H		
0091		01	024		P2	C06	03		J21	*I		
0092		01	024		P2	C14	03		J21	*J		
0093		01	024		P2	J11	03		J21	*P		
0094	B	02	024		P2	D01	03		J12	002		
0094	W	01	024		P2	C08	03		J12	001		
0095	B	02	024		P2	J12	03		J13	002		
0095	W	01	024		P2	J13	03		J13	001		
0098		01	024		P2	D07	03		J22	A		
0099		01	024		P2	D08	03		J22	B		
0100		01	024		P2	H09	03		J22	C		
0101		01	024		P2	H10	03		J22	D		
0102		01	024		P2	D11	03		J22	E		
0103		01	024		P2	D12	03		J22	F		
0104		01	024		P2	E06	03		J22	G		
0105		01	024		P2	D13	03		J22	H		
0106		01	024		P2	D02	03		J22	J		
0107		01	024		P2	D14	03		J22	K		

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0108		01	024		P2	H11	03		J22	L		
0109		01	024		P2	D16	03		J22	M		
0110		01	024		P2	D15	03		J22	N		
0111		01	024		P2	C11	03		J22	P		
0112		01	024		P2	D18	03		J22	S		
0113		01	024		P2	H12	03		J22	U		
0114		01	024		P2	E01	03		J22	W		
0115		01	024		P2	E02	03		J22	X		
0116		01	024		P2	H13	03		J22	Y		
0117		01	024		P2	E03	03		J22	Z		
0118		01	024		P2	D06	03		J22	*A		
0119		01	024		P2	D05	03		J22	*D		
0120		01	024		P2	D04	03		J22	*F		
0121		01	024		P2	D03	03		J22	*G		
0122		01	024		P2	E04	03		J22	*H		
0123		01	024		P2	E05	03		J22	*I		
0124		01	024		P2	E13	03		J22	*J		
0125		01	024		P2	G14	03		J22	*P		
0126		02	024		P2	E12	03		J14	002		
0126	B	01	024		P2	E07	03		J14	001		
0127	W	02	024		P2	E14	03		J15	002		
0127	B	01	024		P2	H14	03		J15	001		
0130		01	024		P2	F02	03		J23	A		
0131		01	024		P2	F03	03		J23	B		
0132		01	024		P2	F04	03		J23	C		
0133		01	024		P2	F05	03		J23	D		
0134		01	024		P2	F06	03		J23	E		
0135		01	024		P2	F07	03		J23	F		
0136		01	024		P2	G05	03		J23	G		
0137		01	024		P2	F08	03		J23	H		
0138		01	024		P2	E15	03		J23	J		
0139		01	024		P2	H05	03		J23	K		
0140		01	024		P2	G10	03		J23	L		
0141		01	024		P2	F11	03		J23	M		
0142		01	024		P2	H06	03		J23	N		
0143		01	024		P2	F12	03		J23	P		

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0144		01	024	P2	P2	F13	03	J23	J23	S		
0145		01	024	P2	P2	G09	03	J23	J23	U		
0146		01	024	P2	P2	F14	03	J23	J23	W		
0147		01	024	P2	P2	F15	03	J23	J23	X		
0148		01	024	P2	P2	G08	03	J23	J23	Y		
0149		01	024	P2	P2	F16	03	J23	J23	Z		
0150		01	024	P2	P2	F01	03	J23	J23	*A		
0151		01	024	P2	P2	E18	03	J23	J23	*D		
0152		01	024	P2	P2	F17	03	J23	J23	*F		
0153		01	024	P2	P2	F16	03	J23	J23	*G		
0154		01	024	P2	P2	F17	03	J23	J23	*H		
0155		01	024	P2	P2	F18	03	J23	J23	*I		
0156		01	024	P2	P2	G12	03	J23	J23	*J		
0157		01	024	P2	P2	H07	03	J23	J23	*P		
0158	B	02	024	P2	P2	G11	03	J16	J16	002		
0158	W	01	024	P2	P2	G06	03	J16	J16	001		
0159	B	02	024	P2	P2	G13	03	J17	J17	002		
0159	W	01	024	P2	P2	G07	03	J17	J17	001		
0160	B	02	024	P1	P1	J06	03	J01	J01	002		
0160	W	01	024	P1	P1	J05	03	J01	J01	001		
0161	B	02	024	P1	P1	J08	03	J02	J02	002		
0161	W	01	024	P1	P1	J07	03	J02	J02	001		
0162	B	02	024	P1	P1	J10	03	J05	J05	002		
0162	W	01	024	P1	P1	J09	03	J05	J05	001		
0168		01	024	P1	P1	A10	03	J24	J24	A		
0169		01	024	P1	P1	A11	03	J24	J24	B		
0170		01	024	P1	P1	A12	03	J24	J24	C		
0171		01	024	P1	P1	A13	03	J24	J24	D		
0172		01	024	P1	P1	A14	03	J24	J24	E		
0173		01	024	P1	P1	B05	03	J24	J24	F		
0174		01	024	P1	P1	C07	03	J24	J24	G		
0175		01	024	P1	P1	R06	03	J24	J24	H		
0176		01	024	P1	P1	A05	03	J24	J24	J		
0177		01	024	P1	P1	B07	03	J24	J24	K		
0178		01	024	P1	P1	C12	03	J24	J24	L		
0179		01	024	P1	P1	B09	03	J24	J24	M		

ENG
NOTEINSTALL
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0180	01	024	P1	B08	03	J24	N
0181	01	024	P1	B10	03	J24	P
0182	01	024	P1	B11	03	J24	S
0183	01	024	P1	C11	03	J24	U
0184	01	024	P1	B12	03	J24	W
0185	01	024	P1	B13	03	J24	X
0186	01	024	P1	C10	03	J24	Y
0187	01	024	P1	B14	03	J24	Z
0188	01	024	P1	A09	03	J24	*A
0189	01	024	P1	A08	03	J24	*D
0190	01	024	P1	A07	03	J24	*F
0191	01	024	P1	A06	03	J24	*G
0192	01	024	P1	C05	03	J24	*H
0193	01	024	P1	C06	03	J24	*I
0194	01	024	P1	C14	03	J24	*J
0195	01	024	P1	D02	03	J20	A
0196	01	024	P1	D04	03	J20	B
0197	01	024	P1	D03	03	J20	C
0198	01	024	P1	F05	03	J20	D
0199	01	024	P1	F07	03	J20	E
0200	01	024	P1	F08	03	J20	F
0201	01	024	P1	G09	03	J20	G
0202	01	024	P1	D05	03	J20	H
0203	01	024	P1	D06	03	J20	J
0204	01	024	P1	D07	03	J20	K
0205	01	024	P1	D08	03	J20	L
0206	01	024	P1	G08	03	J20	M
0207	01	024	P1	G07	03	J20	N
0208	01	024	P1	D11	03	J20	P
0209	01	024	P1	D12	03	J20	R
0210	01	024	P1	D13	03	J20	S
0211	01	024	P1	D14	03	J20	T
0212	01	024	P1	D15	03	J20	U
0213	01	024	P1	D16	03	J20	V
0214	01	024	P1	D17	03	J20	W
0215	01	024	P1	D18	03	J20	X

WIRE NO	CD	ITEM NO	WIRE LGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0216		01	024		P1	E01	03		J20	Y		
0217		01	024		P1	E02	03		J20	Z		
0218		01	024		P1	E03	03		J20	*A		
0219		01	024		P1	F05	03		J20	*B		
0220		01	024		P1	E06	03		J20	*C		
0221		01	024		P1	E07	03		J20	*D		
0222		01	024		P1	F11	03		J20	*E		
0223		01	024		P1	F12	03		J20	*F		
0224		01	024		P1	F13	03		J20	*G		
0225		01	024		P1	F14	03		J20	*H		
0226		01	024		P1	E12	03		J20	*I		
0227		01	024		P1	E13	03		J20	*J		
0228		01	024		P1	E14	03		J20	*K		
0229		01	024		P1	E15	03		J20	*M		
0230		01	024		P1	E16	03		J20	*N		
0231		01	024		P1	E17	03		J20	*P		
0232		01	024		P1	E18	03		J20	*Q		
0233		01	024		P1	F01	03		J20	*R		
0234		01	024		P1	F02	03		J20	*S		
0235		01	024		P1	F03	03		J20	*T		
0236	B	02	024		P1	G05	03		J06	002		
0236	W	01	024		P1	F04	03		J06	001		
0237	B	02	024		P1	G06	03		J04	002		
0237	W	01	024		P1	F06	03		J04	001		
0240		01	024		P3	D12	03		J24	*E		
0241		01	024		P3	D14	03		J24	*P		
0242		01	024		P3	D13	03		J24	*Q		
0243		01	024		P3	D15	03		J24	*R		
0244	B	02	024		P1	C13	03		J18	002		
0244	W	01	024		P1	C08	03		J18	001		
0245	B	02	024		P1	D01	03		J19	002		
0245	W	01	024		P1	C09	03		J19	001		
0248		01	024		K1	A1			J03	TIP		
0249		01	024		K1	A2			J03	SLV		
0250		01	024		K1	A3			J03	RNG		
0251		01	024		K1	B1			J07	TIP		

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0252	01	024		K1	B2	B2			J07	SLV		
0253	01	024		K1	B3	B3			J07	RNG		
0254	01	036		K1	X1	X1			TB1	A05	17	
0255	*			PS1	002	002			A4	POS		
0256	*			PS1	003	003			A4	NEG		
0257	15	024		J08	AC	AC			K2	001		
0258	15	024		J08	AC	AC			K2	003		
0259	15	004		J08	ACC	ACC			J08	C		
0260	15	024		J08	ACC	ACC			PSIV1	001		
0261	15	048		J08	C	C			S1	A		
0262	15	024		J08	D	D			PSIV1	003		
0263	15	024		J08	E	E			PSIV1	002		
0264	15	024		J08	F	F			PSIV1	004		
0265	15	024		K2	004	004			PSIV1	004		
0266	15	048		K2	002	002			S1	D		
0267	16	048		TB1	A02	A02	18		S1	Z		
0268	16	048		TB1	A03	A03	18		S1	Y		
0269	16	004		S1	X	X			S1	Z		
0270	16	024		P1	H05	H05	03		TB1	B03	18	
0271	16	024		P1	H06	H06	03		TB1	B03	18	
0272	16	024		P1	H07	H07	03		TB1	B04	18	
0273	16	024		P1	H08	H08	03		TB1	B04	18	
0274	16	024		P1	H09	H09	03		TB1	B01	18	
0275	16	024		P1	H10	H10	03		TB1	B01	18	
0276	16	024		P1	H11	H11	03		TB1	B02	18	
0277	16	024		P1	H12	H12	03		TB1	B02	18	
0278	16	024		P1	H13	H13	03		TB1	B05	18	
0279	16	024		P1	H14	H14	03		TB1	B05	18	
0280	16	024		P1	G10	G10	03		TB1	B06	18	
0281	16	024		P1	G11	G11	03		TB1	B06	18	
0282	16	024		P1	G12	G12	03		TB1	B07	18	
0283	16	024		P1	G13	G13	03		TB1	B07	18	
0284	16	024		P1	G14	G14	03		TB1	B08	18	
0285	16	024		P1	F18	F18	03		TB1	B08	18	
0286	15	024		PS1	001	001			TB1	A01	18	
0287	15	024		PS1	002	002			TB1	A02	18	

WIRE NO	CD	ITEM NO	WIRE LENGTH	FROM SHLD	FROM COMPONENT	FROM PIN	INSTALL ITEM NO	TO SHLD	TO COMPONENT	TO PIN	INSTALL ITEM NO	ENG NOTE
0288	15	024		PS1	PS1	003			TB1	A03	18	
0289	15	024		PS1	PS1	004			TB1	A03	18	
0290	15	024		PS1	PS1	005			TB1	A05	18	
0291	15	024		PS1	PS1	006			TB1	A06	18	
0292	15	024		PS1	PS1	009			TB1	A07	18	
0293	15	024		PS1	PS1	010			TB1	A08	18	
0294	15	024		PS1	PS1	007			TB1	A04	18	
0295	15	024		PS1	PS1	008			TB1	A04	18	
0296	01	024		P3	P3	F04	03		J25	Y		
1111	*			P3	P3	A13	03		J26	002		
2222	*			P3	P3	A12	03		J26	003		
3333	*			P3	P3	A11	03		J26	004		
4444	*			P3	P3	A10	03		J26	005		
5555	*			P3	P3	A09	03		J26	006		
6666	*			P3	P3	B05	03		J26	007		
7777	*			P3	P3	A07	03		J26	008		
8888	*			P3	P3	A08	03		J26	009		
9099	*			P3	P3	A05	03		J26	011		
9199	*			P3	P3	A06	03		J26	012		
9999	*			P3	P3	R06	03		J26	010		

SECTION 2

1. THE FOLLOWING IS A WIRING DIAGRAM LISTING AND IS INCLUDED AS REFERENCE INFORMATION FOR COMPONENT HOOKUP

REV LTR	SIZE	CODE IDENT NO.	DWG NO.
	A	36090	L541003466
SCALE			SHEET 2-1

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FROM SHLD	FROM COMPONENT	C	WIRE NO.	CLR CDE	IT EM	FR-IT ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
A4	NFG		0256		*			PS1	003	
A4	P0S		0255		*			PS1	002	
J01	001		0160	W	01			P1	J05	
J01	002		0160	B	02			P1	J06	
J02	001		0161	W	01			P1	J07	
J02	002		0161	B	02			P1	J08	
J03	RNG		0250		01			K1	A3	
J03	SLV		0249		01			K1	A2	
J03	TIP		0248		01			K1	A1	
J04	001		0237	W	01			P1	F06	
J04	002		0237	B	02			P1	G06	
J05	001		0162	W	01			P1	J09	
J05	002		0162	B	02			P1	J10	
J06	001		0236	W	01			P1	F04	
J06	002		0236	B	02			P1	G05	
J07	RNG		0253		01			K1	B3	
J07	SLV		0252		01			K1	B2	
J07	TIP		0251		01			K1	B1	
J08	C	)	0259		15			J08	ACC	
J08	C		0261		15			SI	A	
J08	D		0262		15			PS1T1	003	
J08	F		0263		15			PS1T1	002	
J08	F		0264		15			PS1T1	004	
J08	AC		0257		15			K2	001	
J08	AC		0258		15			K2	003	
J08	ACC	)	0259		15			J08	C	
J08	ACC		0260		15			PS1T1	001	

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

FROM SHLD	FROM COMPONENT	C PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTF
J09	A	0001	01	0001	01	01	01	P3	P3	R07	
J09	B	0002	01	0002	01	01	01	P3	P3	R08	
J09	C	0003	01	0003	01	01	01	P3	P3	R09	
J09	D	0004	01	0004	01	01	01	P3	P3	R10	
J09	E	0005	01	0005	01	01	01	P3	P3	R11	
J09	F	0006	01	0006	01	01	01	P3	P3	R12	
J09	G	0007	01	0007	01	01	01	P3	P3	R13	
J09	H	0008	01	0008	01	01	01	P3	P3	R14	
J09	J	0009	01	0009	01	01	01	P3	P3	C08	
J09	K	0010	01	0010	01	01	01	P3	P3	C09	
J09	L	0011	01	0011	01	01	01	P3	P3	C05	
J09	M	0012	01	0012	01	01	01	P3	P3	C12	
J09	N	0013	01	0013	01	01	01	P3	P3	C11	
J09	P	0014	01	0014	01	01	01	P3	P3	C10	
J09	R	0015	01	0015	01	01	01	P3	P3	C07	
J09	S	0016	01	0016	01	01	01	P3	P3	C06	
J09	T	0017	01	0017	01	01	01	P3	P3	C13	
J09	U	0018	01	0018	01	01	01	P3	P3	C14	
J09	V	0019	01	0019	01	01	01	P3	P3	D01	
J10	A	0039	01	0039	01	01	01	P3	P3	G09	
J10	B	0040	01	0040	01	01	01	P3	P3	G10	
J10	C	0041	01	0041	01	01	01	P3	P3	G11	
J10	D	0042	01	0042	01	01	01	P3	P3	G12	
J10	E	0043	01	0043	01	01	01	P3	P3	G13	
J10	F	0044	01	0044	01	01	01	P3	P3	G14	
J10	G	0045	01	0045	01	01	01	P3	P3	H05	
J10	H	0046	01	0046	01	01	01	P3	P3	H06	
J10	J	0047	01	0047	01	01	01	P3	P3	H07	
J10	K	0048	01	0048	01	01	01	P3	P3	H08	
J10	L	0049	01	0049	01	01	01	P3	P3	H09	
J10	M	0050	01	0050	01	01	01	P3	P3	H10	
J10	N	0051	01	0051	01	01	01	P3	P3	H11	
J10	P	0052	01	0052	01	01	01	P3	P3	H12	
J10	R	0053	01	0053	01	01	01	P3	P3	H13	
J10	V	0054	01	0054	01	01	01	P3	P3	D08	

FROM SHLD	FROM COMPONENT	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
J11	J11	A	0055		01			P3	H14	
J11	J11	C	0056		01			P3	D05	
J11	J11	E	0057		01			P3	D06	
J11	J11	G	0058		01			P3	J07	
J11	J11	K	0059		01			P3	J08	
J11	J11	M	0060		01			P3	J09	
J11	J11	N	0061		01			P3	J10	
J11	J11	P	0062		01			P3	J11	
J11	J11	R	0063		01			P3	J12	
J11	J11	S	0064		01			P3	J13	
J12	J12	001	0094	W	01			P2	C08	
J12	J12	002	0094	B	02			P2	D01	
J13	J13	001	0095	W	01			P2	J13	
J13	J13	002	0095	B	02			P2	J12	
J14	J14	001	0126	W	01			P2	E07	
J14	J14	002	0126	B	02			P2	E12	
J15	J15	001	0127	W	01			P2	H14	
J15	J15	002	0127	B	02			P2	E14	
J16	J16	001	0158	W	01			P2	G06	
J16	J16	002	0158	B	02			P2	G11	
J17	J17	001	0159	W	01			P2	G07	
J17	J17	002	0159	B	02			P2	G13	
J18	J18	001	0244	W	01			P1	C08	
J18	J18	002	0244	B	02			P1	C13	
J19	J19	001	0245	W	01			P1	C09	
J19	J19	002	0245	B	02			P1	D01	
J20	J20	A	0195		01			P1	D02	

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
J20		B		0196		01		PI		D04	
J20		C		0197		01		PI		D03	
J20		D		0198		01		PI		F05	
J20		E		0199		01		PI		F07	
J20		F		0200		01		PI		F08	
J20		G		0201		01		PI		G09	
J20		H		0202		01		PI		D05	
J20		J		0203		01		PI		D06	
J20		K		0204		01		PI		D07	
J20		L		0205		01		PI		D08	
J20		M		0206		01		PI		G08	
J20		N		0207		01		PI		G07	
J20		P		0208		01		PI		D11	
J20		R		0209		01		PI		D12	
J20		S		0210		01		PI		D13	
J20		T		0211		01		PI		D14	
J20		U		0212		01		PI		D15	
J20		V		0213		01		PI		D16	
J20		W		0214		01		PI		D17	
J20		X		0215		01		PI		D18	
J20		Y		0216		01		PI		E01	
J20		Z		0217		01		PI		F02	
J20		*A		0218		01		PI		E03	
J20		*B		0219		01		PI		E05	
J20		*C		0220		01		PI		E06	
J20		*D		0221		01		PI		F07	
J20		*E		0222		01		PI		F11	
J20		*F		0223		01		PI		F12	
J20		*G		0224		01		PI		F13	
J20		*H		0225		01		PI		F14	
J20		*I		0226		01		PI		E12	
J20		*J		0227		01		PI		F13	
J20		*K		0228		01		PI		F14	
J20		*M		0229		01		PI		F15	
J20		*N		0230		01		PI		E16	
J20		*P		0231		01		PI		E17	

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FROM SHLD	FROM COMPONENT	PIN	C	WIRE NO.	CLR CDE	IT EM	FR-IN ITFM	TO SHLD	TO COMPONENT	PIN	ENG NTE
J20	J20	*Q		0232		01			P1	E18	
J20	J20	*R		0233		01			P1	F01	
J20	J20	*S		0234		01			P1	F02	
J20	J20	*T		0235		01			P1	F03	
J21	J21	A		0066		01			P2	A10	
J21	J21	B		0067		01			P2	A11	
J21	J21	C		0068		01			P2	A12	
J21	J21	D		0069		01			P2	A13	
J21	J21	E		0070		01			P2	A14	
J21	J21	F		0071		01			P2	B05	
J21	J21	G		0072		01			P2	C07	
J21	J21	H		0073		01			P2	B06	
J21	J21	J		0074		01			P2	A05	
J21	J21	K		0075		01			P2	B07	
J21	J21	L		0076		01			P2	C12	
J21	J21	M		0077		01			P2	B09	
J21	J21	N		0078		01			P2	B08	
J21	J21	P		0079		01			P2	B10	
J21	J21	S		0080		01			P2	B11	
J21	J21	U		0081		01			P2	C13	
J21	J21	W		0082		01			P2	B12	
J21	J21	X		0083		01			P2	B13	
J21	J21	Y		0084		01			P2	C10	
J21	J21	7		0085		01			P2	B14	
J21	J21	*A		0086		01			P2	A09	
J21	J21	*D		0087		01			P2	A08	
J21	J21	*F		0088		01			P2	A07	
J21	J21	*G		0089		01			P2	A06	
J21	J21	*H		0090		01			P2	C05	
J21	J21	*I		0091		01			P2	C06	
J21	J21	*J		0092		01			P2	C14	
J21	J21	*P		0093		01			P2	J11	
J22	J22	A		0098		01			P2	D07	
J22	J22	R		0099		01			P2	D08	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
J22		C		0100		01			P2	H09	
J22		D		0101		01			P2	H10	
J22		F		0102		01			P2	011	
J22		F		0103		01			P2	012	
J22		G		0104		01			P2	E06	
J22		H		0105		01			P2	013	
J22		J		0106		01			P2	002	
J22		K		0107		01			P2	014	
J22		L		0108		01			P2	H11	
J22		M		0109		01			P2	016	
J22		N		0110		01			P2	015	
J22		P		0111		01			P2	C11	
J22		S		0112		01			P2	018	
J22		U		0113		01			P2	H12	
J22		W		0114		01			P2	E01	
J22		X		0115		01			P2	E02	
J22		Y		0116		01			P2	H13	
J22		7		0117		01			P2	E03	
J22		*A		0118		01			P2	006	
J22		*D		0119		01			P2	005	
J22		*F		0120		01			P2	004	
J22		*G		0121		01			P2	003	
J22		*H		0122		01			P2	E04	
J22		*I		0123		01			P2	E05	
J22		*J		0124		01			P2	E13	
J22		*P		0125		01			P2	G14	
J23		A		0130		01			P2	F02	
J23		B		0131		01			P2	F03	
J23		C		0132		01			P2	F04	
J23		D		0133		01			P2	F05	
J23		E		0134		01			P2	F06	
J23		F		0135		01			P2	F07	
J23		G		0136		01			P2	G05	
J23		H		0137		01			P2	F08	
J23		J		0138		01			P2	F15	

FROM SHLD	FROM COMPONENT	C	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
J23	K	0139	01				P2		H05	
J23	L	0140	01				P2		G10	
J23	M	0141	01				P2		F11	
J23	N	0142	01				P2		H06	
J23	P	0143	01				P2		F12	
J23	S	0144	01				P2		F13	
J23	U	0145	01				P2		G09	
J23	W	0146	01				P2		F14	
J23	X	0147	01				P2		F15	
J23	Y	0148	01				P2		G08	
J23	Z	0149	01				P2		F16	
J23	*A	0150	01				P2		F01	
J23	*D	0151	01				P2		E18	
J23	*F	0152	01				P2		E17	
J23	*G	0153	01				P2		E16	
J23	*H	0154	01				P2		F17	
J23	*I	0155	01				P2		F18	
J23	*J	0156	01				P2		G12	
J23	*P	0157	01				P2		H07	
J24	A	0168	01				P1		A10	
J24	B	0169	01				P1		A11	
J24	C	0170	01				P1		A12	
J24	D	0171	01				P1		A13	
J24	E	0172	01				P1		A14	
J24	F	0173	01				P1		B05	
J24	G	0174	01				P1		C07	
J24	H	0175	01				P1		B06	
J24	J	0176	01				P1		A05	
J24	K	0177	01				P1		B07	
J24	L	0178	01				P1		C12	
J24	M	0179	01				P1		B09	
J24	N	0180	01				P1		B08	
J24	P	0181	01				P1		B10	
J24	S	0182	01				P1		H11	
J24	U	0183	01				P1		C11	

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

FROM SHLD	FROM COMPONENT	PIN	C	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG. NTE
J24		W		0184		01			PI	B12	
J24		X		0185		01			PI	B13	
J24		Y		0186		01			PI	C10	
J24		Z		0187		01			PI	B14	
J24		*A		0188		01			PI	A09	
J24		*D		0189		01			PI	A08	
J24		*E		0240		01			P3	D12	
J24		*F		0190		01			PI	A07	
J24		*G		0191		01			PI	A06	
J24		*H		0192		01			PI	C05	
J24		*I		0193		01			PI	C06	
J24		*J		0194		01			PI	C14	
J24		*P		0241		01			P3	D14	
J24		*Q		0242		01			P3	D13	
J24		*R		0243		01			P3	D15	
J25		A		0022		01			P3	F06	
J25		B		0023		01			P3	F07	
J25		C		0024		01			P3	F08	
J25		D		0025		01			P3	E06	
J25		E		0026		01			P3	E07	
J25		F		0027		01			P3	F11	
J25		G		0028		01			P3	F12	
J25		H		0029		01			P3	F13	
J25		J		0030		01			P3	F14	
J25		K		0031		01			P3	F15	
J25		L		0032		01			P3	F18	
J25		M		0033		01			P3	F17	
J25		N		0034		01			P3	G05	
J25		P		0035		01			P3	F16	
J25		Y		0296		01			P3	F04	
J25		Z		0020		01			P3	F02	
J25		*A		0036		01			P3	G06	
J25		*B		0037		01			P3	G07	
J25		*T		0021		01			P3	F03	
J25		*T		0038		01			P3	G08	

ENG
NTE

PIN

TO
COMPONENTTO
SHLDFR-IN
ITEMIT
EMCLR
CDEWIRE
NO.C
D

PIN

FROM
COMPONENTFROM
SHLD

J26	001	0000	*						P3	A14
J26	002	1111	*						P3	A13
J26	003	2222	*						P3	A12
J26	004	3333	*						P3	A11
J26	005	4444	*						P3	A10
J26	006	5555	*						P3	A09
J26	007	6666	*						P3	B05
J26	008	7777	*						P3	A07
J26	009	8888	*						P3	A08
J26	010	9999	*						P3	B06
J26	011	9099	*						P3	A05
J26	012	9199	*						P3	A06
K1	A1	0248	01						J03	TIP
K1	A2	0249	01						J03	SLV
K1	A3	0250	01						J03	RNG
K1	B1	0251	01						J07	TIP
K1	R2	0252	01						J07	SLV
K1	R3	0253	01						J07	RNG
K1	X1	0254	01						TB1	A05
K1	X2	0065	01						P3	F05
K2	001	0257	15						J08	AC
K2	002	0266	15						S1	D
K2	003	0258	15						J08	AC
K2	004	0265	15						PS1T1	004
PS1	001	0286	15						TB1	A01
PS1	002	0255	*						A4	POS
PS1	002	0287	15						TB1	A02
PS1	003	0256	*						A4	NEG
PS1	003	0288	15						TB1	A03
PS1	004	0289	15						TB1	A03
PS1	005	0290	15						TB1	A05
PS1	006	0291	15						TB1	A06
PS1	007	0294	15						TB1	A04

FROM SHLD	FROM COMPONENT	C PIN	D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
PS1	PS1	008		0295		15			T81	A04	
PS1	PS1	009		0292		15			T81	A07	
PS1	PS1	010		0293		15			T81	A08	
PS1T1	PS1T1	001		0260		15			J08	ACC	
PS1T1	PS1T1	002		0263		15			J08	E	
PS1T1	PS1T1	003		0262		15			J08	D	
PS1T1	PS1T1	004		0264		15			J08	F	
PS1T1	PS1T1	004		0265		15			K2	004	
P1	P1	A05		0176		01	03		J24	J	
P1	P1	A06		0191		01	03		J24	*G	
P1	P1	A07		0190		01	03		J24	*F	
P1	P1	A08		0189		01	03		J24	*D	
P1	P1	A09		0188		01	03		J24	*A	
P1	P1	A10		0168		01	03		J24	A	
P1	P1	A11		0169		01	03		J24	B	
P1	P1	A12		0170		01	03		J24	C	
P1	P1	A13		0171		01	03		J24	D	
P1	P1	A14		0172		01	03		J24	E	
P1	P1	B05		0173		01	03		J24	F	
P1	P1	B06		0175		01	03		J24	H	
P1	P1	B07		0177		01	03		J24	K	
P1	P1	B08		0180		01	03		J24	N	
P1	P1	B09		0179		01	03		J24	M	
P1	P1	B10		0181		01	03		J24	P	
P1	P1	B11		0182		01	03		J24	S	
P1	P1	B12		0184		01	03		J24	W	
P1	P1	B13		0185		01	03		J24	X	
P1	P1	B14		0187		01	03		J24	Z	
P1	P1	C05		0192		01	03		J24	*H	
P1	P1	C06		0193		01	03		J24	*I	
P1	P1	C07		0174		01	03		J24	G	
P1	P1	C08		0244	W	01	03		J18	001	
P1	P1	C09		0245	W	01	03		J19	001	
P1	P1	C10		0186		01	03		J24	Y	

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FROM SHLD	FROM COMPONENT	PIN	C	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P1	C11	0183				01	03	J24	U		
P1	C12	0178				01	03	J24	L		
P1	C13	0244			B	02	03	J18	002		
P1	C14	0194				01	03	J24	*J		
P1	D01	0245			B	02	03	J19	002		
P1	D02	0195				01	03	J20	A		
P1	D03	0197				01	03	J20	C		
P1	D04	0196				01	03	J20	B		
P1	D05	0202				01	03	J20	H		
P1	D06	0203				01	03	J20	J		
P1	D07	0204				01	03	J20	K		
P1	D08	0205				01	03	J20	L		
P1	D11	0208				01	03	J20	P		
P1	D12	0209				01	03	J20	R		
P1	D13	0210				01	03	J20	S		
P1	D14	0211				01	03	J20	T		
P1	D15	0212				01	03	J20	U		
P1	D16	0213				01	03	J20	V		
P1	D17	0214				01	03	J20	W		
P1	D18	0215				01	03	J20	X		
P1	E01	0216				01	03	J20	Y		
P1	F02	0217				01	03	J20	Z		
P1	F03	0218				01	03	J20	*A		
P1	F05	0219				01	03	J20	*B		
P1	E06	0220				01	03	J20	*C		
P1	E07	0221				01	03	J20	*D		
P1	E12	0226				01	03	J20	*I		
P1	E13	0227				01	03	J20	*J		
P1	E14	0228				01	03	J20	*K		
P1	F15	0229				01	03	J20	*M		
P1	E16	0230				01	03	J20	*N		
P1	E17	0231				01	03	J20	*P		
P1	E18	0232				01	03	J20	*Q		
P1	F01	0233				01	03	J20	*R		
P1	F02	0234				01	03	J20	*S		
P1	F03	0235				01	03	J20	*T		

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FROM SHLD	FROM COMPONENT	FROM PIN	C	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P1	F04			0236	W	01	03		J06	001	D
P1	F05			0198		01	03		J20	001	E
P1	F06			0237	W	01	03		J04		F
P1	F07			0199		01	03		J20		*E
P1	F08			0200		01	03		J20		*F
P1	F11			0222		01	03		J20		*G
P1	F12			0223		01	03		J20		*H
P1	F13			0224		01	03		J20		R08
P1	F14			0225		01	03		J20		002
P1	F18			0285		16	03		T81		002
P1	G05			0236	B	02	03		J06		N
P1	G06			0237	B	02	03		J04		M
P1	G07			0207		01	03		J20		G
P1	G08			0206		01	03		J20		R06
P1	G09			0201		01	03		T81		R06
P1	G10			0280		16	03		T81		R07
P1	G11			0281		16	03		T81		R07
P1	G12			0282		16	03		T81		R08
P1	G13			0283		16	03		T81		R03
P1	G14			0284		16	03		T81		R03
P1	H05			0270		16	03		T81		R04
P1	H06			0271		16	03		T81		R04
P1	H07			0272		16	03		T81		R01
P1	H08			0273		16	03		T81		R01
P1	H09			0274		16	03		T81		R02
P1	H10			0275		16	03		T81		R02
P1	H11			0276		16	03		T81		R05
P1	H12			0277		16	03		T81		R05
P1	H13			0278		16	03		T81		001
P1	H14			0279		16	03		T81		002
P1	J05			0160	W	01	03		J01		001
P1	J06			0160	B	02	03		J01		002
P1	J07			0161	W	01	03		J02		001
P1	J08			0161	B	02	03		J02		002
P1	J09			0162	W	01	03		J05		001
P1	J10			0162	B	02	03		J05		002

FROM SHLD	FROM COMPONENT	PIN	C	WIRE NO.	CLR CDF	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P2	A05	0074				01	03	J21	J21	J	
P2	A06	0089				01	03	J21	J21	*G	
P2	A07	0088				01	03	J21	J21	*F	
P2	A08	0087				01	03	J21	J21	*D	
P2	A09	0086				01	03	J21	J21	*A	
P2	A10	0066				01	03	J21	J21	A	
P2	A11	0067				01	03	J21	J21	B	
P2	A12	0068				01	03	J21	J21	C	
P2	A13	0069				01	03	J21	J21	D	
P2	A14	0070				01	03	J21	J21	E	
P2	B05	0071				01	03	J21	J21	F	
P2	B06	0073				01	03	J21	J21	H	
P2	B07	0075				01	03	J21	J21	K	
P2	B08	0078				01	03	J21	J21	N	
P2	B09	0077				01	03	J21	J21	M	
P2	B10	0079				01	03	J21	J21	P	
P2	B11	0080				01	03	J21	J21	S	
P2	B12	0082				01	03	J21	J21	W	
P2	B13	0083				01	03	J21	J21	X	
P2	B14	0085				01	03	J21	J21	Z	
P2	C05	0090				01	03	J21	J21	*H	
P2	C06	0091				01	03	J21	J21	*I	
P2	C07	0072				01	03	J21	J21	G	
P2	C08	0094			W	01	03	J12	J12	001	
P2	C10	0084				01	03	J21	J21	Y	
P2	C11	0111				01	03	J22	J22	P	
P2	C12	0076				01	03	J21	J21	L	
P2	C13	0081				01	03	J21	J21	U	
P2	C14	0092				01	03	J21	J21	*J	
P2	D01	0094			B	02	03	J12	J12	002	
P2	D02	0106				01	03	J22	J22	J	
P2	D03	0121				01	03	J22	J22	*G	
P2	D04	0120				01	03	J22	J22	*F	
P2	D05	0119				01	03	J22	J22	*D	
P2	D06	0118				01	03	J22	J22	*A	
P2	D07	0098				01	03	J22	J22	A	

3 3 4 5 1 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

FROM SHLD	FROM COMPONENT	C	WIRE NO.	CLR CODE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P2	D08		0099		01	03		J22	B	
P2	D11		0102		01	03		J22	E	
P2	D12		0103		01	03		J22	F	
P2	D13		0105		01	03		J22	H	
P2	D14		0107		01	03		J22	K	
P2	D15		0110		01	03		J22	N	
P2	D16		0109		01	03		J22	M	
P2	D18		0112		01	03		J22	S	
P2	E01		0114		01	03		J22	W	
P2	E02		0115		01	03		J22	X	
P2	E03		0117		01	03		J22	Z	
P2	E04		0122		01	03		J22	*H	
P2	E05		0123		01	03		J22	*I	
P2	E06		0104		01	03		J22	G	
P2	E07		0126	W	01	03		J14	001	
P2	E12		0126	B	02	03		J14	002	
P2	E13		0124		01	03		J22	*J	
P2	E14		0127	B	02	03		J15	002	
P2	E15		0138		01	03		J23	J	
P2	E16		0153		01	03		J23	*G	
P2	E17		0152		01	03		J23	*F	
P2	E18		0151		01	03		J23	*D	
P2	F01		0150		01	03		J23	*A	
P2	F02		0130		01	03		J23	A	
P2	F03		0131		01	03		J23	B	
P2	F04		0132		01	03		J23	C	
P2	F05		0133		01	03		J23	D	
P2	F06		0134		01	03		J23	E	
P2	F07		0135		01	03		J23	F	
P2	F08		0137		01	03		J23	H	
P2	F11		0141		01	03		J23	M	
P2	F12		0143		01	03		J23	P	
P2	F13		0144		01	03		J23	S	
P2	F14		0146		01	03		J23	W	
P2	F15		0147		01	03		J23	X	
P2	F16		0149		01	03		J23	Z	

FROM SHLD	FROM COMPONENT	PIN	C D	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P2	F17			0154		01	03	J23		*H	
P2	F18			0155		01	03	J23		*I	
P2	G05			0136		01	03	J23		G	
P2	G06		W	0158		01	03	J16		001	
P2	G07		W	0159		01	03	J17		001	
P2	G08			0148		01	03	J23		Y	
P2	G09			0145		01	03	J23		U	
P2	G10			0140		01	03	J23		L	
P2	G11		B	0158		02	03	J16		002	
P2	G12			0156		01	03	J23		*J	
P2	G13		B	0159		02	03	J17		002	
P2	G14			0125		01	03	J22		*P	
P2	H05			0139		01	03	J23		K	
P2	H06			0142		01	03	J23		N	
P2	H07			0157		01	03	J23		*P	
P2	H09			0100		01	03	J22		C	
P2	H10			0101		01	03	J22		D	
P2	H11			0108		01	03	J22		L	
P2	H12			0113		01	03	J22		U	
P2	H13			0116		01	03	J22		Y	
P2	H14		W	0127		01	03	J15		001	
P2	J11			0093		01	03	J21		*P	
P2	J12		B	0095		02	03	J13		002	
P2	J13		W	0095		01	03	J13		001	
P3	A05			9099		*	03	J26		011	
P3	A06			9199		*	03	J26		012	
P3	A07			7777		*	03	J26		008	
P3	A08			8888		*	03	J26		009	
P3	A09			5555		*	03	J26		006	
P3	A10			4444		*	03	J26		005	
P3	A11			3333		*	03	J26		004	
P3	A12			2222		*	03	J26		003	
P3	A13			1111		*	03	J26		002	
P3	A14			0000		*	03	J26		001	
P3	B05			6666		*	03	J26		007	

L541003466

DWG NO.

MARK

UNIT

S0005-2

DIAGRAM LIST

ENG
NTE

PIN

TO
COMPONENT

TO
SHLD

FR-
IN
ITEM

IT
EM

CLR
CDE

WIRE
NO.

C
D

FROM
COMPONENT

FROM
SHLD

010

J26

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FROM SHLD	FROM COMPONENT	C PIN	WIRE NO.	CLR CDE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
P3	F11	0027	01	03	J25	F				
P3	F12	0028	01	03	J25	G				
P3	F13	0029	01	03	J25	H				
P3	F14	0030	01	03	J25	J				
P3	F15	0031	01	03	J25	K				
P3	F16	0035	01	03	J25	P				
P3	F17	0033	01	03	J25	M				
P3	F18	0032	01	03	J25	L				
P3	G05	0034	01	03	J25	N				
P3	G06	0036	01	03	J25	*A				
P3	G07	0037	01	03	J25	*B				
P3	G08	0038	01	03	J25	*T				
P3	G09	0039	01	03	J10	A				
P3	G10	0040	01	03	J10	B				
P3	G11	0041	01	03	J10	C				
P3	G12	0042	01	03	J10	D				
P3	G13	0043	01	03	J10	E				
P3	G14	0044	01	03	J10	F				
P3	H05	0045	01	03	J10	G				
P3	H06	0046	01	03	J10	H				
P3	H07	0047	01	03	J10	J				
P3	H08	0048	01	03	J10	K				
P3	H09	0049	01	03	J10	L				
P3	H10	0050	01	03	J10	M				
P3	H11	0051	01	03	J10	N				
P3	H12	0052	01	03	J10	P				
P3	H13	0053	01	03	J11	R				
P3	H14	0055	01	03	J11	A				
P3	J07	0058	01	03	J11	G				
P3	J08	0059	01	03	J11	K				
P3	J09	0060	01	03	J11	M				
P3	J10	0061	01	03	J11	N				
P3	J11	0062	01	03	J11	P				
P3	J12	0063	01	03	J11	R				
P3	J13	0064	01	03	J11	S				

FROM SHLD	FROM COMPONENT	PIN	C	WIRE NO.	CLR CODE	IT EM	FR-IN ITEM	TO SHLD	TO COMPONENT	PIN	ENG NTE
S1		A		0261		15			J08	C	
S1		D		0266		15			K2	002	
S1		X		0269		16			S1	7	
S1		Y		0268		16			TB1	A03	
S1		Z		0267		16			TB1	A02	
S1		7		0269		16			S1	X	
TB1		A01		0286		15	18		PS1	001	
TB1		A02		0267		16	18		S1	Z	
TB1		A02		0287		15	18		PS1	002	
TB1		A03		0268		16	18		S1	Y	
TB1		A03		0288		15	18		PS1	003	
TB1		A03		0289		15	18		PS1	004	
TB1		A04		0294		15	18		PS1	007	
TB1		A04		0295		15	18		PS1	008	
TB1		A05		0254		01	17		K1	X1	
TB1		A05		0290		15	18		PS1	005	
TB1		A06		0291		15	18		PS1	006	
TB1		A07		0292		15	18		PS1	009	
TB1		A08		0293		15	18		PS1	010	
TB1		B01		0274		16	18		P1	H09	
TB1		B01		0275		16	18		P1	H10	
TB1		B02		0276		16	18		P1	H11	
TB1		B02		0277		16	18		P1	H12	
TB1		B03		0270		16	18		P1	H05	
TB1		B03		0271		16	18		P1	H06	
TB1		B04		0272		16	18		P1	H07	
TB1		B04		0273		16	19		P1	H08	
TB1		B05		0278		16	18		P1	H13	
TB1		B05		0279		16	18		P1	H14	
TB1		B06		0280		16	18		P1	G10	
TB1		B06		0281		16	18		P1	G11	
TB1		B07		0282		16	18		P1	G12	
TB1		B07		0283		16	18		P1	G13	
TB1		B08		0284		16	18		P1	G14	
TB1		B08		0285		16	18		P1	F18	

X. REFERENCES
OPERATOR'S HANDBOOK
CP7
L 191 000 650

SINGER LIBRASCOPE DIVISION		SIZE A	FSCM NO. 36090	DWG NO. L 200 024 705	
DRAWN	SEE PAGE 1	SCALE			SHEET 40 of 40
ISSUED	SEE PAGE 1				

ENGINEERING ORDER ☒
(SEPARATE PARTS LIST)

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR/CHANGE NO. _____
SHEET / OF 3

Drawing Title COMPUTER PROGRAMMER MODEL CP-7					Customer No. PL		Librascope No. L200 024 705 PL 200 024 705		Revision 1		
Next Assembly ☐ Multi-Use					Customer No. of N/A		Libra. No. of N/A		Class Chg II		
Serialized Item Nomenclature					Cust. No. of Ser. Item		Libra. No. of Ser. Item		Rel Corr BW		
End Item Nomenclature ☐ Multi-Use CP-7					Cust. No. of End Item		Libra. No. of End Item		11-14 77		
Reason for Revision TO ADD & DELETE PARTS					Change Requested on Contract N/A				Change Order		
					Change Board Date				Drawing Change		
Orig. Date 11-9-77 <i>Amber</i>		Drawn Date 11-9-77 <i>Amber</i>		Checked Date 11-9-77 <i>Amber</i>		Proj. Eng. Date 11-9-77 <i>Amber</i>		Proj. Mgr. Date *		Chair. Eng. Q.C.	
										RFI No. DCR No.	
										ECP No. D/W No.	
										Customer Approval N/A	
AFFECTED		YES NO		DISPOSITION OF ITEM				Concurrence of Class		SERIALIZED ITEM	
Master Layout				In Process In Stock N/A In Process N/A Compl.				Immediate Compliance		Effective Serial in Mfg.	
Eng. Spec. (ES)				Use As Is				Optimum Cost		001 & 503	
Test Equipment				Rework				End Item		Serial Req. Backfit	
P.O. Change Req'd.				Scrap (MRB Req'd.)				Not Affected		Serials in Compliance	
				Parts Conform				Record Change Only			
				Reinspect							
				Repair (MRB Req'd.)						Mfg. Job No. Affected 148-401	

DESCRIPTION OF CHANGE

PARTS LIST:

ITEM 29 QTY 15: 15 S/B: 25

ITEM 40 PART NO. 15: 3184905

S/B: L360 000 110; 1828291

ITEM 58 15: H795 160 624; M551957-36; 1.50 LG

S/B: H795 160 620; M551957-35; 1.25 LG

ITEM 59 15: H795 160 808; M551957-45; .50 LG

S/B: H795 160 807; M551957-44; .44 LG

ADD ITEM 71; 2; H549 160 801; 1287424-6; NUT SLF-CK4, HEX, .164-32

ITEM 74: 15: 3 COND S/B: 3 COND

ADD ITEM 25; 2; L217 000 033; BUS BAR

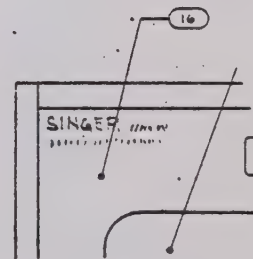
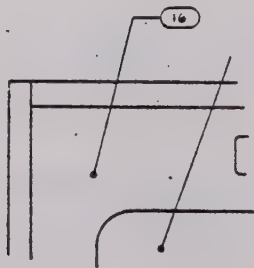
Drawing Title	COMPUTER PROGRAMMER MODEL CP-7	Customer No.	Librascope No.	Revision
			L200024705	1

ADD BUS BAR INSTALLATION CHART TO
F/D:

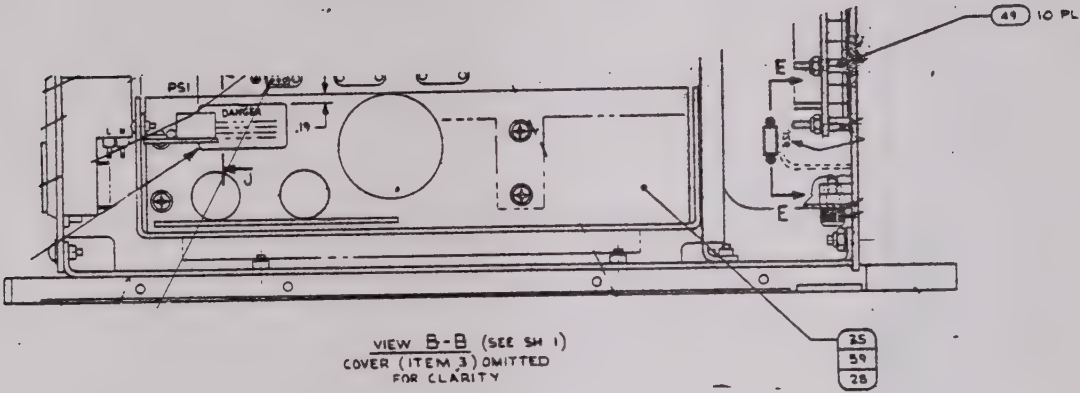
BUS BAR INSTALLATION CHART

STARTING CONN & PIN NO.	TERMINATING CONN & PIN NO.	BUS BAR ITEM NO.
XA1-A	XA11-1	25
XA1-Z	XA11-22	25

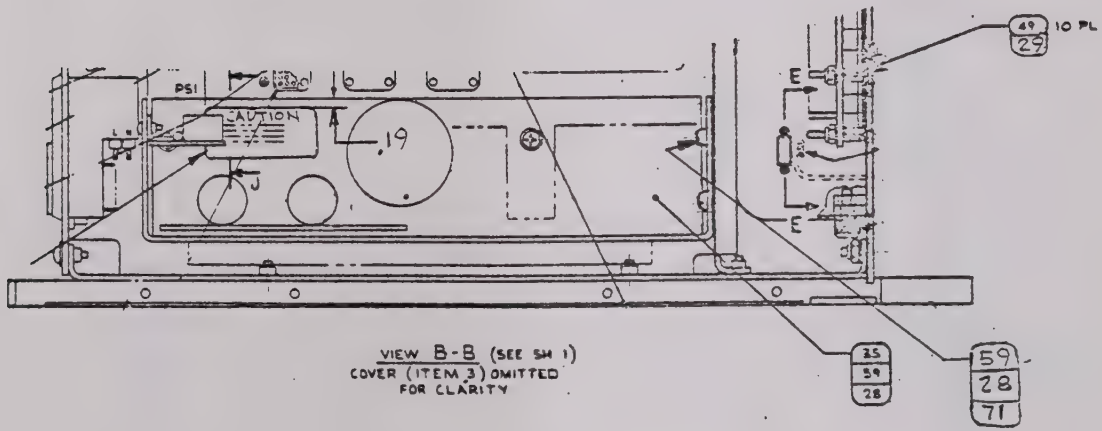
SH 1, ZONE 4 D ADD:



SH2 ZONE 2C THRU 5C



IS:



S/B:

PARTS LIST

SINGER

LIBRASCOP
GLENDALE, CA. 91201CODE IDENT
36090

PL L200024705

REVISION

2

SH NO.

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOP NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	SYM	LINE NO.
1	1			T300015501		SIDE PLATE ASSY (RIGHT)		1
2	1			T300015502		SIDE PLATE ASSY (LEFT)		2
3	1			T315006901		COVER ASSEMBLY (TOP)		3
4	1			T315006902		COVER ASSEMBLY (BOTTOM)		4
5	1			L200024683		KEYBOARD-COVER ASSY		5
6	1			L300005015		PLATE ASSY, SOCKET MTG		6
7	1			L535300616		CIRCUIT CARD ASSY-DISPLAY DRIVER	A1	7
8	1			L535300615		CIRCUIT CARD ASSY-INTERFACE MOD	A2	8
9	4			L535300598		CIRCUIT CARD ASSY-EMI METER CONTROLLER	A3-A6	9
10	1			L535300597		CIRCUIT CARD ASSY-AUXILIARY CONTROLLER	A7	10
11	1			L535300596		CIRCUIT CARD ASSY-ANALOG OUTPUT MOD	A8	11
12	1			L535300595		CIRCUIT CARD ASSY-DATA ACQUISITION MOD	A9	12
13	1			L535300594		CIRCUIT CARD ASSY-PROM MOD	A10	13
14	1			L535300593		CIRCUIT CARD ASSY-MICRO-PROCESSOR I/O MOD	A11	14
15	1			L3300003307		BRACKET, BASE		15
16	1			L523001866		PANEL, KEYBOARD		16
								17
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PARTS LIST

SINGER

LIBRASCOP
GLENDALE, CA. 91201CODE IDENT
36090

PL 200024705

REVISION

3

SH NO.

FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOP NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION	SYM	LINE NO.
17				L536000352		COMPONENT, BOARD ASSY		1
18	1			L330003299		BRACKET, RIGHT SIDE		2
19	1			L330003309		BRACKET, LEFT SIDE		3
20	1			L330003308		BRACKET		4
21	1			L300005010		PLATE, CONNECTOR MTG		5
22	11			L520011338		CONNECTOR, WIRE WRAP	XA1- XA11	6
23								7
24	3				3184850	CONNECTOR, RECEPTACLE 106 PIN, WIRE WRAP	A1J1, A1J2, A1J3	8
25								9
26	16			L312 000 327	706125-27	WASHER, SHIM NO. 10 (REDUCED O.D.)		10
27	4			H955161003	AN960C10L	WASHER, FLAT #10		11
28	48			H955160804	AN960C8	WASHER, FLAT #8		12
29	15			H955160603	AN960C6L	WASHER, FLAT #6		13
30	112			H955160403	AN960C4L	WASHER, FLAT #4		14
31	1			L507002863		SWITCH, PUSH	S1	15
32	1			L200024684		BUTTON ASSY, POWER SWITCH		16
33	1			L503001009		RELAY, ARMATURE 2 PDT	K1	17
34	1			L503001012		RELAY, SOLID STATE (LED OPTICAL ISOLATION)	K2	18
								19
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PARTS LIST				SINGER		LIBRASCOPÉ GLENDALE, CA. 91201		CODE IDENT 36090	PL 200024705	REVISION	SH NO. 4	
FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPÉ NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION					SYM	LINE NO.
35	1			L501000292		POWER SUPPLY					PS1	1
36	1			L414000147		OVERVOLTAGE PROTECTION MOD					AI2	2
37	1			L540002763	8TB10	TERMINAL BOARD MIL-T-55164					TB1	3
38	11			L200 024707		POLARIZING KEY						4
39	1			L360 006649		DECAL, FUSE & VOLTAGE						5
40	1				3184905	PLATE, INSTRUCTION						6
41	2			L320004397		SCREW, SHOULDER						7
42	1			L360 006648		PLATE, IDENTIFICATION						8
43												9
44	2			L336001864		CLAMP. LOOP						10
45		AR		L312000319/ 327	706125-19/27	WASHER, SHIM						11
46	2			L336008027	MS3367-1-9	STRAP, CABLE ADJ. SELF-LKG #1						12
47		AR		L502000526	MS21266-2	GROMMET, CATERPILLAR						13
48		AR		L101000176	ECCO BOND #51	ADHESIVE, EPOXY RESIN						14
49	10			L301001185	1240089-15	POST, SPACER (.469 LG)						15
50	4			L301001186	1240089-16	POST, SPACER (.500 LG)						16
51	1			L317000146		WINDOW, EMI						17
52	1			L505 800 758	F02BI25V2AS	FUSE, (TIME LAG) 125V, 2A						18
53	1			L505 800 756	F02B250VIAS	FUSE, (TIME LAG) 250V, 1A						19
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PARTS LIST			SINGER		LIBRASCOPÉ GLENDALE, CA. 91201		CODE IDENT 36090	PL 200024705	REVISION	SH NO. 5
FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOPÉ NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION				LINE NO.
54				L101000822	3179329	ADHESIVE SEALANT CONDUCTIVE				1
55		AR		H795160408	MS51957-17	SCREW, PANHD .112-40X 1/2LG				2
56	48			H793160406	NAS1635-04LE6	SCREW, PANHD SLF-LKG .112-40X .375 LG				3
57	22			H795160624	MS51957-36	SCREW, PANHD .138-32X 1.50LG				4
58	1			H795160808	MS51957-45	SCREW, PAN HD .164-32X .50LG				5
59	30			H669160812	1486137-62	SCREW, CAP HEX SLF-LKG .164-32X .75LG				6
60	16			H670161008	1486136-87	SCREW, CAP, HEX, SOC HD SLF-LKG .190-32X .50LG				7
61	16			H771160406	NAS1189E04P6	SCREW, MACH, FL HD, 100 .112-40X .38LG				8
62		REF		H795160810	MS51957-46	SCREW, PAN HD .164-32X, 62LG				9
63	2			H795160406	MS51957-15	SCREW, PAN HD .112-40X .38LG				10
64	4					NUT, SLF-LKG HEX .190-32				11
65						NUT, SLF-LGK HEX .138-32				12
66						NUT, SLF-LKG HEX .112-40				13
67						WIRING DATA, CARD RACK CP7				14
68	4									15
69	15									16
70	50									17
71										18
72	1									19

PARTS LIST		SINGER		LIBRASCOP E GLENDALE, CA. 91201		CODE IDENT 36090	PL 200024705	REVISION	SH NO. 6
FIND NO.	QTY REQD	UNIT OF MEAS	CODE IDENT	LIBRASCOP E NUMBER	PART OR IDENTIFYING NUMBER	NOMENCLATURE, DESCRIPTION OR SPECIFICATION		SYM	LINE NO.
73	1			L541003466		WIRING HARNESS			1
74	1			L542001613		CABLE, LINE, B COND		(SEE NOTE 6)	2
									3
									4
									5
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VIII. DRAWING LIST

<u>TITLE</u>	<u>LIBRASCOPE NO.</u>	<u>CARD POSITION</u>
TOP ASSEMBLY CP7	L200 024 705	
POWER SUPPLY (POWER ONE SUPPLEMENT)		
CIRCUIT CARD ASSEMBLY -- MICROPROCESSOR I/O MODULE	L535 300 593	A 11
SCHEMATIC DIAGRAM -- MICROPROCESSOR I/O MODULE	L543 200 593	
CIRCUIT CARD ASSEMBLY -- PROM MODULE	L535 300 594	A 10
SCHEMATIC DIAGRAM -- PROM MODULE	L543 200 594	
CIRCUIT CARD ASSEMBLY -- DATA ACQUISITION MODULE	L535 300 595	A 9
SCHEMATIC DIAGRAM -- DATA ACQUISITION MODULE	L543 200 595	
CIRCUIT CARD ASSEMBLY -- ANALOG OUTPUT MODULE	L535 300 596	A 8
SCHEMATIC DIAGRAM -- ANALOG OUTPUT MODULE	L543 200 596	
CIRCUIT CARD ASSEMBLY -- AUXILIARY CONTROLLER	L535 300 597	A 7
SCHEMATIC DIAGRAM -- AUXILIARY CONTROLLER	L543 200 597	
CIRCUIT CARD ASSEMBLY -- EMI METER CONTROLLER	L535 300 598	A 6-3
SCHEMATIC DIAGRAM -- EMI METER CONTROLLER	L543 200 598	
CIRCUIT CARD ASSEMBLY -- INTERFACE MODULE	L535 300 615	A 2
SCHEMATIC DIAGRAM -- INTERFACE MODULE	L543 200 615	
CIRCUIT CARD ASSEMBLY -- DISPLAY DRIVER	L535 300 616	A 1
SCHEMATIC DIAGRAM -- DISPLAY DRIVER	L543 200 616	
CIRCUIT CARD ASSEMBLY -- KEYBOARD	L535 300 618	
SCHEMATIC DIAGRAM -- KEYBOARD	L543 200 618	

NOTES:

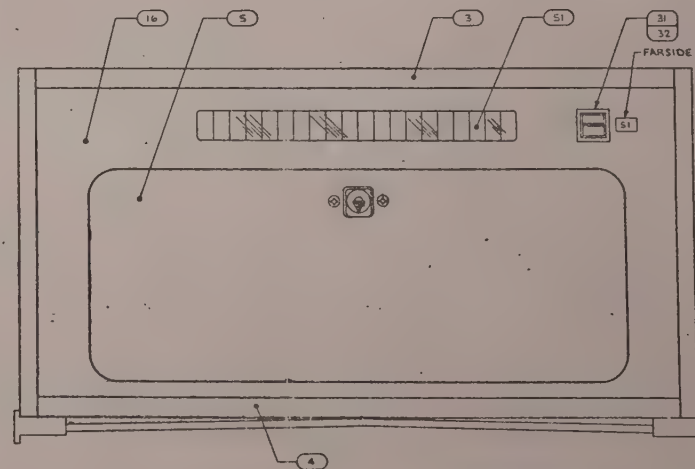
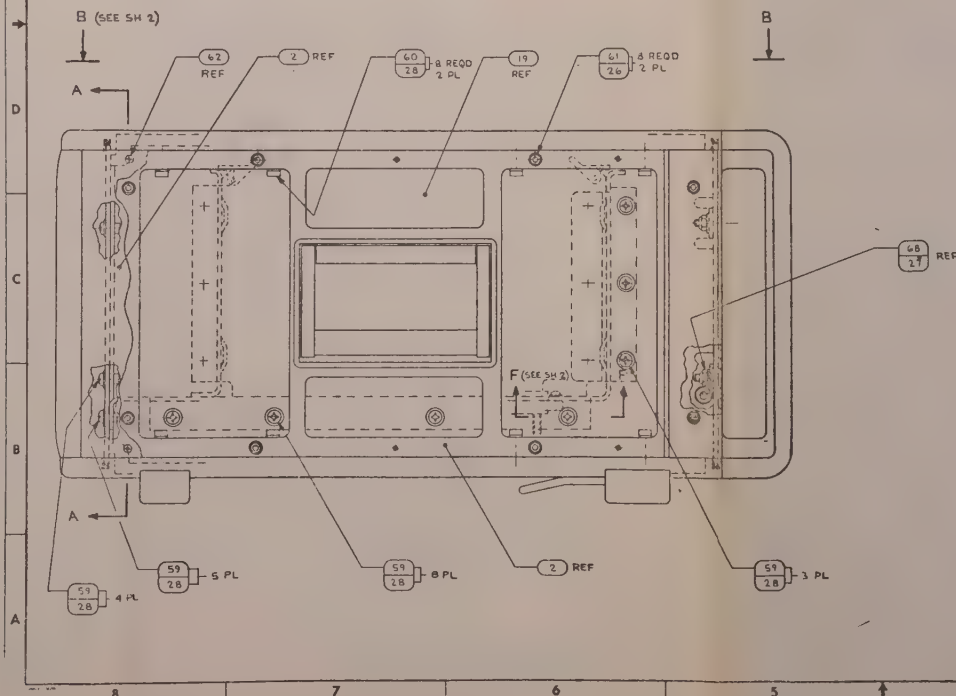
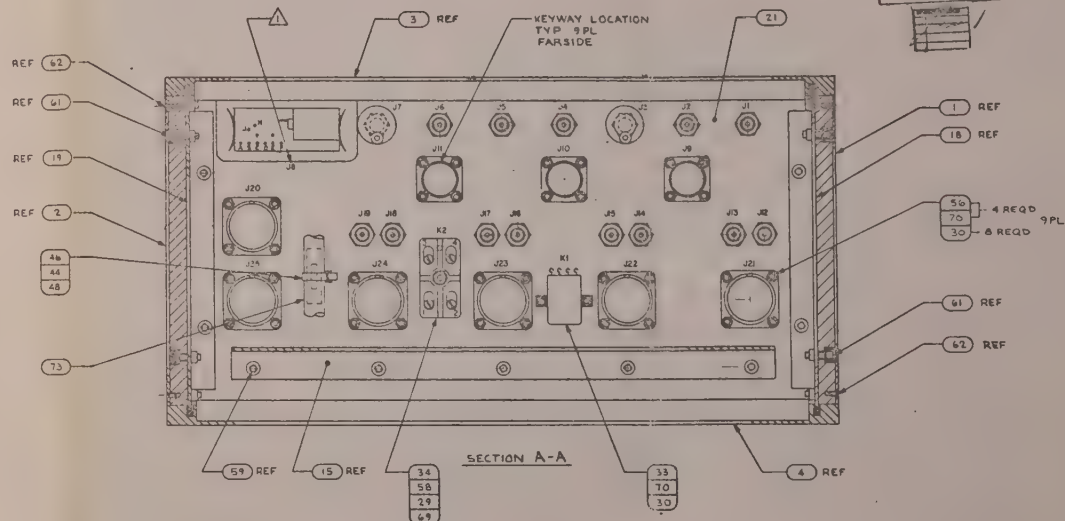
1. MARK REFERENCE DESIGNATIONS APPROX WHERE SHOWN (AW MIL-STD-130)
2. SHIM FROM BOTH SIDES AS REQD TO ACHIEVE EQUAL GAP BETWEEN ITEMS 5 & 16
3. APPLY ADHESIVE (ITEM 55) TO FLANGE AREA OF EMI WINDOW (ITEM 51) BEFORE ASSY.
4. REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH UNIT NO., ASSY DESIGNATION OR BOTH
5. MOUNTING HARDWARE SUPPLIED WITH ITEM 36
6. ITEM 74 IS A LOOSE PIECE ITEM TO BE SHIPPED WITH ASSEMBLY.

KEYING CHART

ITEM NO.	BETWEEN CONTACTS	CONNECTOR REF DES	KEY ITEM NO.	QTY
7	11-18	XAI	38	1
8	6-11	XA2		1
9	15-16	XA3, XA4, XA5, XA6		4
10	4-15	XA7		1
11	15	XA8		1
12	12-13	XA9		1
13	11-12	XA10		1
14	10-11	XA11	38	1

REFERENCE DWGS:

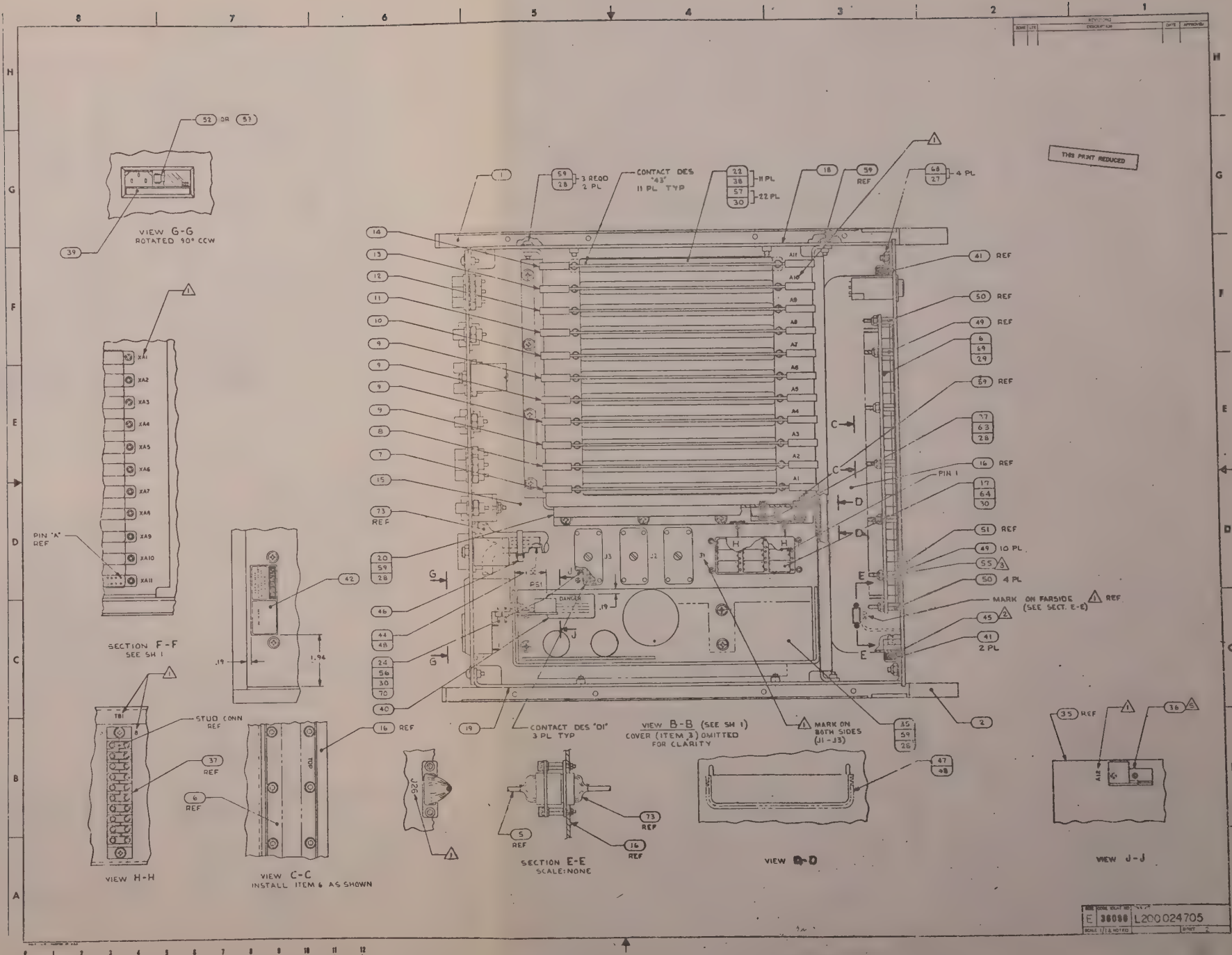
ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 005 300
OUTLINE & INSTALLATION
DWG NO. L547 000 182
FACTORY ACCEPTANCE TEST
DWG NO. L192 000 122



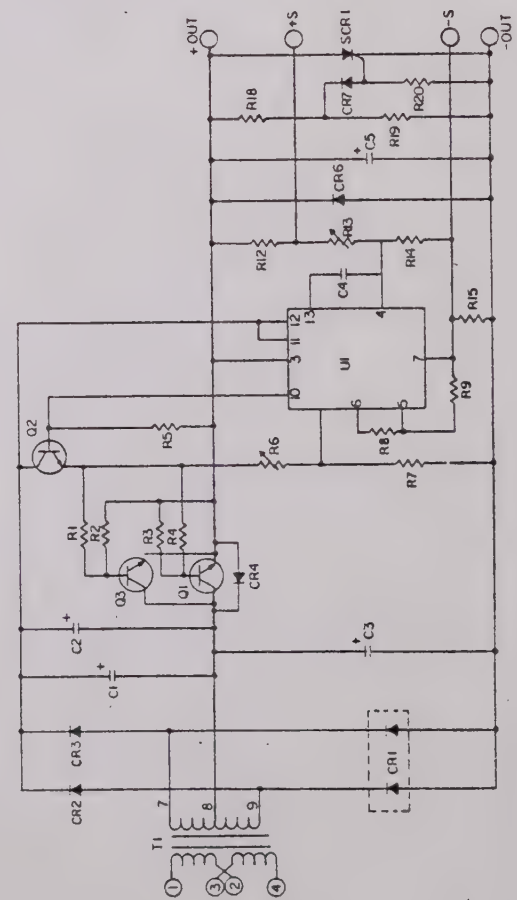
SEE SEPARATE PARTS LIST

THIS DRAWING SPECIFICATION DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature] DATE: [Date] CONTRACT NO. [Number] PROJECT NO. [Number] REVISION NO. [Number] REVISION DATE [Date]		SINGER GLENDALE, CA. 91204 COMPUTER PROGRAMMER MODEL CP-7 REV 34:38 DATE 10/1/75 BY [Signature]
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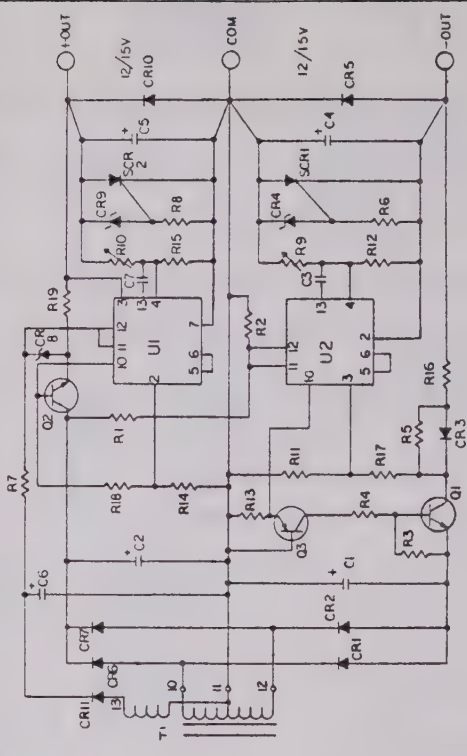
SHEET 2	REVISION STATUS
SHEET 1	OF SHEET



REF DES	DESCRIPTION
C4	HD5-12 OVP
C1,2,5	1000/100
C3	40000/15
CR1	DIODE BRIDGE
CR2,3,4	AE1C
CR6	AE3B
CR7	IN752A
Q1,2,3	2N3055
SCR1	5050BLS3
UI	U1A,723
R1,4	3.9K
R2,3,12,15,18	6.8K
R5,8,9,7	2.2K
R14	1.6K
R19,20	82K
R6,13	1.5K
T1	TRANSFORMER
PCB	11050
CHASSIS	11141
PRINTED CIRCUIT BOARD	
CHASSIS, ALUM	



REF DES	HBIS	HBIS OVP	DESCRIPTION
C1,2	8500/35	8500/35	CAPACITOR ALUM. ELECT.
C4,5	100/85	100/85	ALUM. ELECT.
C6,7	.01/100	.01/100	CAPACITOR MYLAR
CR1,2,12,3	AE3B	AE3B	DIODE 3A 100V
CR5,10	AE1C	AE1C	DIODE ZENER
CR8	IN750A/IN750A(12)	IN750A/IN750A(12)	DIODE ZENER
CR4,9	50303LS3	50303LS3	SCR 3A
Q3	2N2905	2N2905	TRANSISTOR
Q1,2	2N3055	2N3055	TRANSISTOR
UI,7	U1A,723	U1A,723	I.C. VOLTAGE REGULATOR
R19,16	.22	.22	RESISTOR 2W, 1/4W, 1/2W
R15,12	1K	1K	1/2W CARBON
R18,17	220K	220K	
R13,12	330K	330K	
R14,11	4.7K	4.7K	
R5,7	2.7K	2.7K	
R6,8	.47K	.47K	
R9,10	1.5K	1.5K	POTENTIOMETER 2W, 1/2W
PCB	12080	12080	PRINTED CIRCUIT BOARD



ENGINEERING ORDER ☒

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title CIRCUIT CARD ASSEMBLY FROM MODULE					Customer No. —		Librascope No. L535300594		Revision 2		
Next Assembly ☐ Multi-Use COMPUTER PROGRAMMER MODEL CP7					Customer No. of N/A —		Libra. No. of N/A L200024705		Class Chg II		
Serialized Item Nomenclature					Cust. No. of Ser. Item —		Libra. No. of Ser. Item —		Rel Coord 9-21/77		
End Item Nomenclature ☐ Multi-Use CP7					Cust. No. of End Item —		Libra. No. of End Item —				
Reason for Revision UPDATE DWG					Change Requested on Contract N/A			Change Order			
								Drawing Change X			
Orig. Date M. Allison 1956PT17		Drawn Date —		Checked Date M. Allison 2156AT177		Proj. Eng. Date *		Proj. Mgr. Date *		Change Board Date	
								Chair. Eng. 9 Q.C.		RFI No. DCR No.	
								C.M. Mfg.		ECP No. D/W No.	
AFFECTED		YES NO		DISPOSITION OF ITEM				Customer Approval N/A		SERIALIZED ITEM	
								Concurrence of Class ☐		Effective Serial in Mfg.	
Master Layout		X		In Process In Stock N/A In Process N/A Compl.				Immediate Compliance		Serial Req. Backfit	
Eng. Spec. (ES)		X		X X X X				Optimum Cost		Serials in Compliance.	
Test Equipment		X		Use As Is Rework				End Item		Mfg. Job No. Affected	
P.O. Change Req'd.		X		Scrap (MRB Req'd.)				Not Affected		A8-401	
Assembly PL Revision Control				Parts Conform				Record Change Only			
Separate PL @ Rev.				Reinspect							
Drawing @ Rev.				Repair (MRB Req'd)							
DESCRIPTION OF CHANGE											
REVISED & REDRAWN ON NEW FORMAT WAS; "A" SIZE 4 SHTS											
INCORP ED REV 1											

ENGINEERING ORDER ☒
(SEPARATE PARTS LIST)

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR/CHANGE NO. _____
SHEET / OF 3

Drawing Title COMPUTER PROGRAMMER MODEL CP-7					Customer No. PL		Librascope No. L200 024 705 PL200 024 705		Revision 1	
Next Assembly ☐ Multi-Use					Customer No. of N/A		Libra. No. of N/A		Class Chg II	
Serialized Item					Cust. No. of Ser. Item		Libra. No. of Ser. Item		Rel Coqr BW	
End Item Nomenclature CP-7 ☐ Multi-Use					Cust. No. of End Item		Libra. No. of End Item		11-14 77	
Reason for Revision TO ADD & DELETE PARTS					Change Requested on Contract N/A				Change Order	
					Change Board Date				Drawing Change	
Orig. Date 11-9-77					Drawn Date 11-9-77		Checked Date 11-9-77		Proj. Eng. Date 11-9-77	
					Chair.		Eng.		Q.C.	
					C.M.		Mfg.		ECP No.	
									D/W No.	
AFFECTED			YES	NO	DISPOSITION OF ITEM				Customer Approval N/A	
					In Process	In Stock	N/A In Process	N/A Compl.	Concurrence of Class	
Master Layout				☒					Immediate Compliance	
Eng. Spec. (ES)				☒	Use As Is				☒	
Test Equipment				☒	Rework	☒	☒	☒	Optimum Cost	
P.O. Change Req'd.				☒	Scrap (MRB Req'd.)				End Item	
					Parts Conform				Not Affected	
					Reinspect				Record Change	
					Repair (MRB Req'd)				Only	
DESCRIPTION OF CHANGE									SERIALIZED ITEM	
									Effective Serial in Mfg.	
									Serial Req. Backfit	
									Serials in Compliance	
									Mfg. Job No. Affected	

PARTS LIST:

ITEM 29 QTY 15: 15 S/B: 25

ITEM 40 PART NO. 15: 3184905

S/B: L360 000 110; 1828291

ITEM 58 15: H795 160 624; M551957-36; 1.50 LG

S/B: H795 160 620; M551957-35; 1.25 LG

ITEM 59 15: H795 160 808; M551957-45; .50 LG

S/B: H795 160 807; M551957-44; .44 LG

ADD ITEM 71; 2; H599 160 801; 1287924-6; NUT SLF-CK4, HEX, .164-32

ITEM 74: 15: 3 COND S/B: 3 COND

ADD ITEM 25; 2; L217 000 033; BUS BAR

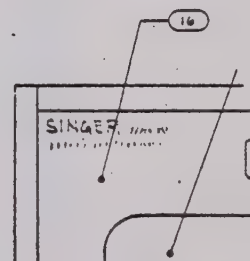
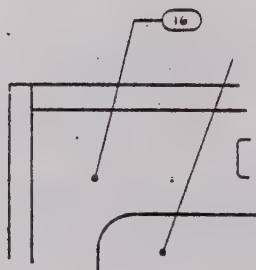
Drawing Title	COMPUTER PROGRAMMER MODEL CP-7	Customer No.	Librascope No.	Revision
			L200029705	1

ADD BUS BAR INSTALLATION CHART TO
F/D:

BUS BAR INSTALATION CHART

STARING CONN & PIN NO.	TERMINATING CONN & PIN NO.	BUS BAR ITEM NO.
XA1-A	XA11-1	25
XA1-Z	XA11-22	25

SH 1, ZONE 4 D ADD:



ENGINEERING ORDER

NOTICE OF REVISION

SINGER
LIBRASCOPE DIVISION

CODE IDENT 36090

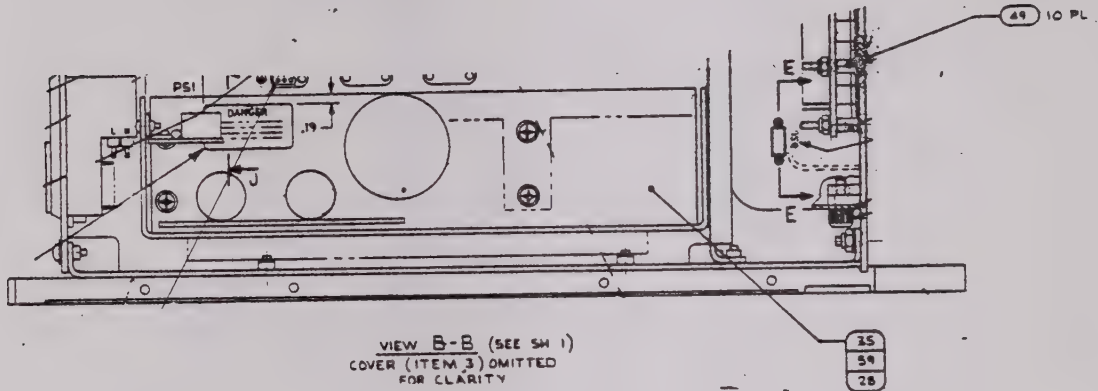
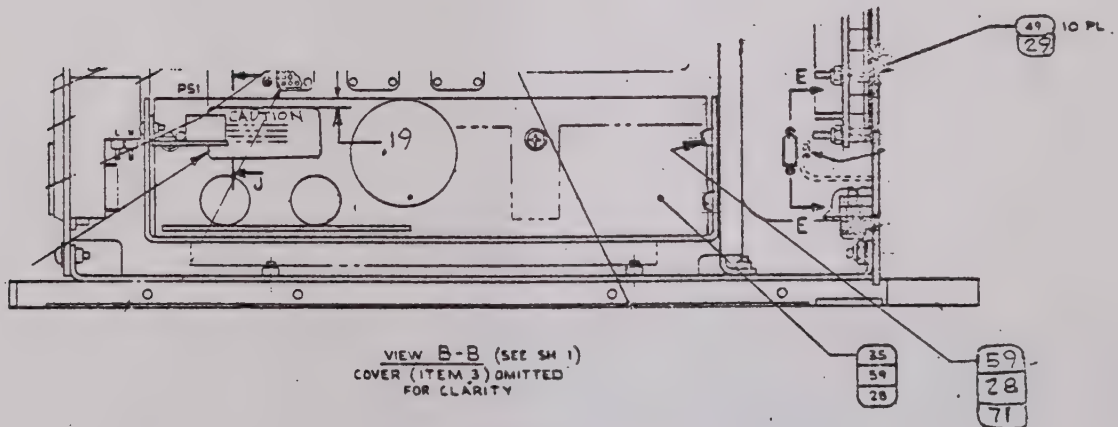
SHEET 3

Drawing Title
COMPUTER PROGRAMMER
MODEL CP-7

Customer No.

Librascope No.
L200024705Revision
1

SH2 ZONE 2C THRU 5C

IS:S/B:

5

4

3

-2

2

1

PROPRIETARY STATEMENT

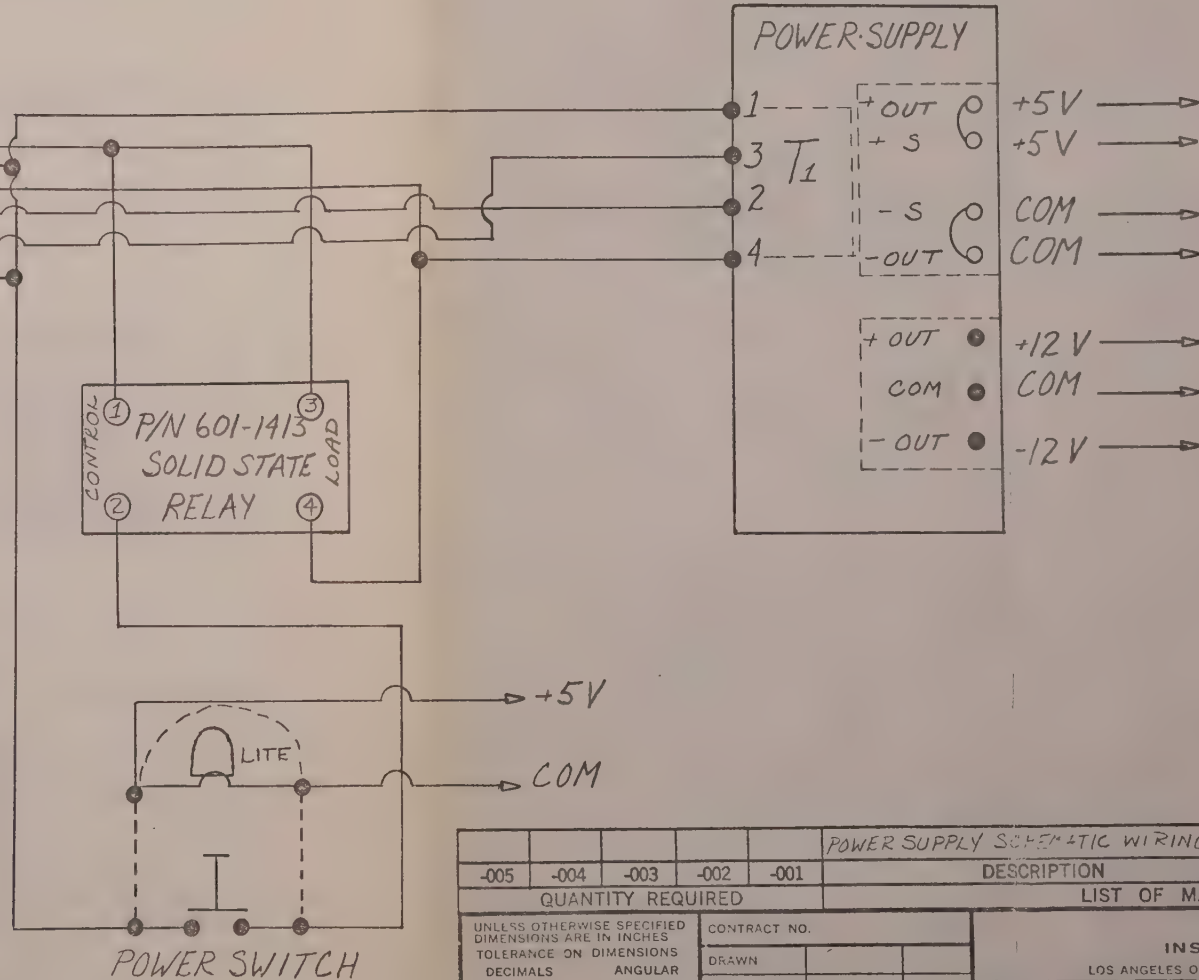
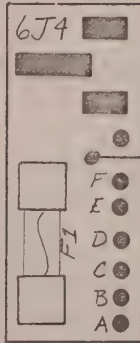
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CLASS CODE

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

AC POWER LINE
CONNECTION
115 TO 230V
47 TO 140 Hz



POWER SWITCH

POWER SUPPLY SCHEMATIC WIRING					1		
-005	-004	-003	-002	-001	DESCRIPTION	PART NO.	ITEM
QUANTITY REQUIRED					LIST OF MATERIALS		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON DIMENSIONS DECIMALS ANGULAR 2 PLACE ± ± 3 PLACE ± ±					CONTRACT NO.		
MATERIAL					DRAWN		
					CHECK		
					ELEC ENGR		
					MECH ENGR		
					APPROVED		
FINISH:					SCHEMATIC NO.		SIZE
MODEL NO.					NEXT ASSEMBLY NO.		CODE IDENT NO.
							DWG NO.
							REV
					SCALE		SHEET / OF /

SINGER INSTRUMENTATION
LOS ANGELES OPER. DIV. LOS ANGELES, CALIF.

CPT POWER

NOTES: UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

5

4

3

2

1



POWER-ONE Inc.

531 DAWSON DR.
CAMARILLO, CALIF. 93010
(805) 484-2806

APPLICATION DATA

- Including:
1. Schematic
 2. Parts Lists
 3. Specification
 4. Outline & Mounting Dwg.
 5. General User Information

MODEL

HDBB-105W

SPECIFICATIONS

AC Input: 115/230 VAC $\pm 10\%$ 47-440 HZ (Derate Current 10%
for 50 HZ operation)

Input Fusing: See Table

DC Output: 5VDC @ 12A, OVP @ 6.2 $\pm$.4VDC & $\pm$ 12V @ 1.7A
or $\pm$ 15V @ 1.5A

Line Regulation: $\pm$.05% for a 10% input change

Load Regulation: $\pm$.05% for a 50% load change

Output Ripple: 1.5 mv Pk-Pk, 0.4 mv RMS

Transient Response: 30 μ sec for 50% load change

Overload & Short Circuit Protection: Automatic current limit/foldback

Temperature Coefficient: $\pm$.03%/°C maximum

Cooling: Units are full rated to 50°C in free air, must be derated
or fan cooled when mounted in confined area

Temperature Rating: 0 - 50°C, full rated, derate linearly to 40% at 70°C

Efficiency: 55% at nominal input, full load on output

Weight: 8 lbs.

Vibration: Per Mil-Std-810B, method 514, proc. I, curve AB (to 50 HZ)

Shock: Per Mil-Std-810B, method 516, procedure V

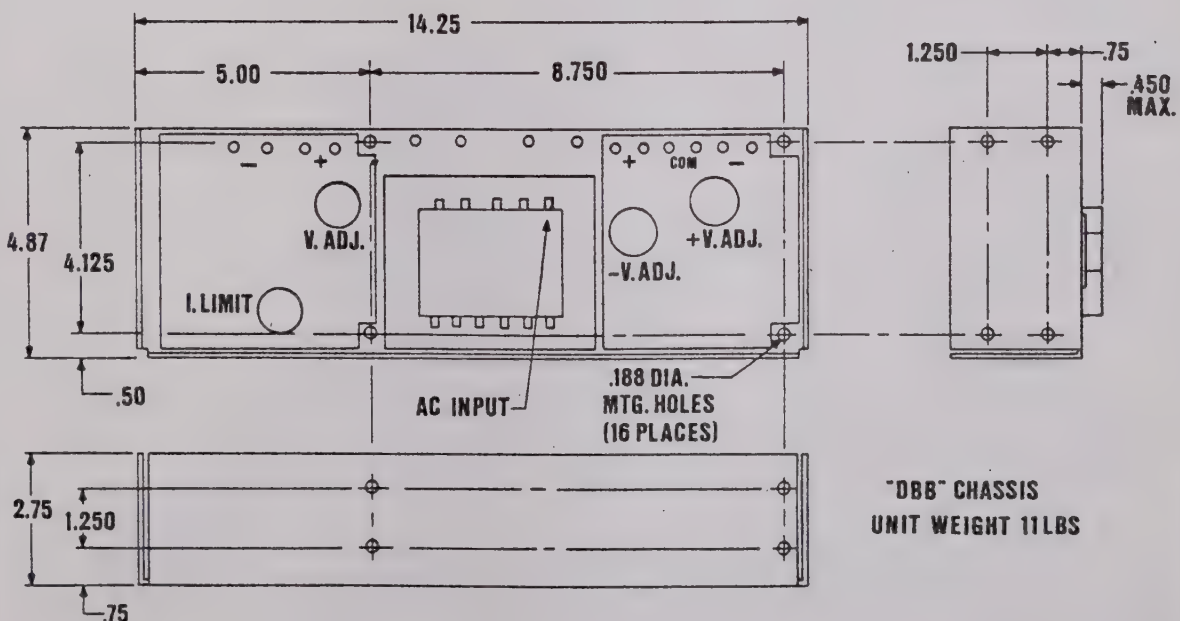
Remote Sensing: Provided on 5V output, open lead protection built in.

AC Connection & Fuse Table

For Use At	Primary Fuse At	Connect	Apply Power to
115	3A	1-3, 2-4	1 & 4
230	1.5A	2-3	1 & 4

2 YEAR GUARANTEE

POWER-ONE will repair or replace any power supply of its manufacture that does not perform to published specifications as a result of defective materials or workmanship for a period of 2 years from date of original purchase. No other obligations or liabilities are implied or expressed. Returns must be freight prepaid.



ENGINEERING ORDER ☒NOTICE OF REVISION ☐SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____

SHEET 1 OF 1

Drawing Title CIRCUIT CARD ASSEMBLY MICROPROCESSOR 1/0 MODULE				Customer No. —		Librascope No. L 535 300 593		Revision 2	
Next Assembly COMPUTER PROGRAMMER MODEL CP7				Customer No. of N/A —		Libra. No. of N/A L200 024 705		Class Chg II	
Serialized Item Nomenclature				Cust. No. of Ser. Item —		Libra. No. of Ser. Item —		Rel Coord (3u)	
End Item Nomenclature CPL				Cust. No. of End Item —		Libra. No. of End Item —		10-3 77	
Reason for Revision TO COMPLETE ASSY DRAWING				Change Requested on Contract N/A			Change Order Drawing Change X		
Orig. Date —				Drawn Date James		Checked Date M. Allion		Proj. Eng. Date *	
30 SEPT 77				77-10-2		Proj. Mgr. Date *			
AFFECTED				DISPOSITION OF ITEM				Customer Approval	
YES		NO		In Process		In Stock		N/A In Process	
				N/A Compl.				N/A	
Master Layout		X		Use As Is		X		X	
Eng. Spec. (ES)		X		Rework		X		X	
Test Equipment		X		Scrap (MRB Req'd.)					
P.O. Change Req'd.		X		Parts Conform					
Assembly PL Revision Control				Reinspect					
Separate PL @ Rev.				Repair (MRB Req'd.)					
Drawing @ Rev.									
DESCRIPTION OF CHANGE				Customer Approval Concurrence of Class N/A				SERIALIZED ITEM	
				Immediate Compliance				Effective Serial in Mfg.	
				Optimum Cost				Serial Req. Backfit	
				End Item Not Affected				Serials in Compliance.	
				Record Change Only				Mfg. Job No. Affected AB-401	

REVISED & REDRAWN ON NEW FORMAT

IS "A" SIZE, 4 SHEETSS/B "D" SIZE

IN P/L:

FIND NO. 10

IS: 1 QTY L200 024 681 CRYSTAL, 4 MHzS/B: "DELETED"

FIND NO. 22

IS: 1 QTY, L537 000 291, IC, GEN DRIVER, CLOCK, 2 PH (MC6875)S/B: 1 QTY, T537 028 501, IC, CLOCK, FULL FUNCTION, 1.0 MHz (MC6871AL)

FIND NO. 21

IS: 1 QTY, L604 005 106, RESISTOR, 10K OHM $\pm 5\%$, 1/4WS/B: 1 QTY, L604 005 099, RESISTOR, 5100 OHM $\pm 5\%$, 1/4W

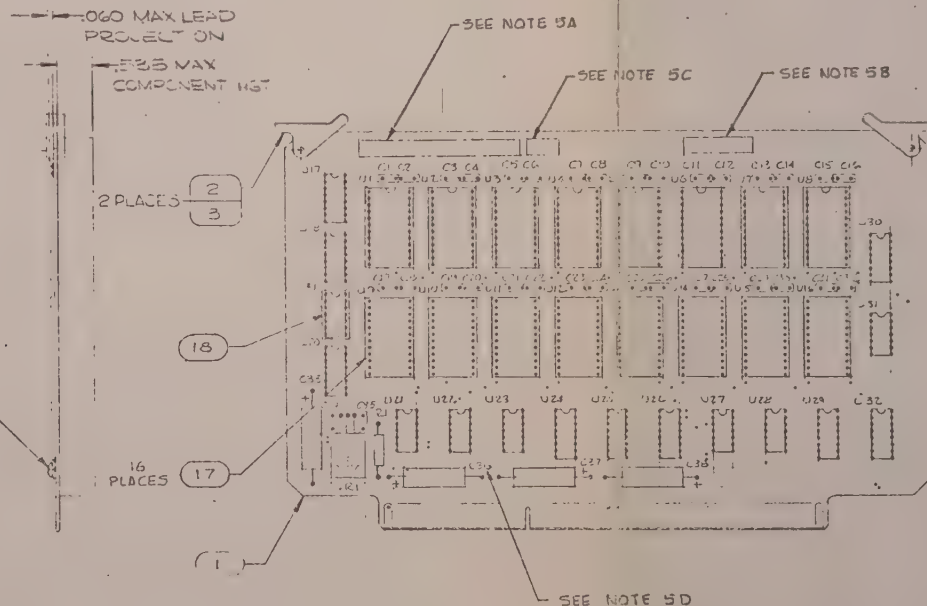
FIND NO. 19

IS: 1 QTY, L609 006 233, CAPACITOR, TANT, 1UFS/B: 1 QTY, L609 021 831, CAPACITOR, TANT, 15UFADD25, 1 QTY, L604 005 069, RESISTOR, 300 OHM $\pm 5\%$, 1/4W

26, 1 QTY, L531 003 175, DIODE (IN914)

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 594
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.



REFERENCES:

1. ELECTRICAL SCHEMATIC DIAGRAM DWG NO. L543 200 594

U17, U18, U26	20
Z1	19
R1	16
C33, C36-C38	15
C1-C32, C34, C35	14
VR1	13
U31	12
U27	11
U28	10
U23	9
U20, U30	8
U1-U8	7
U24, U25	6
U21, U22	5
U23, U32	4

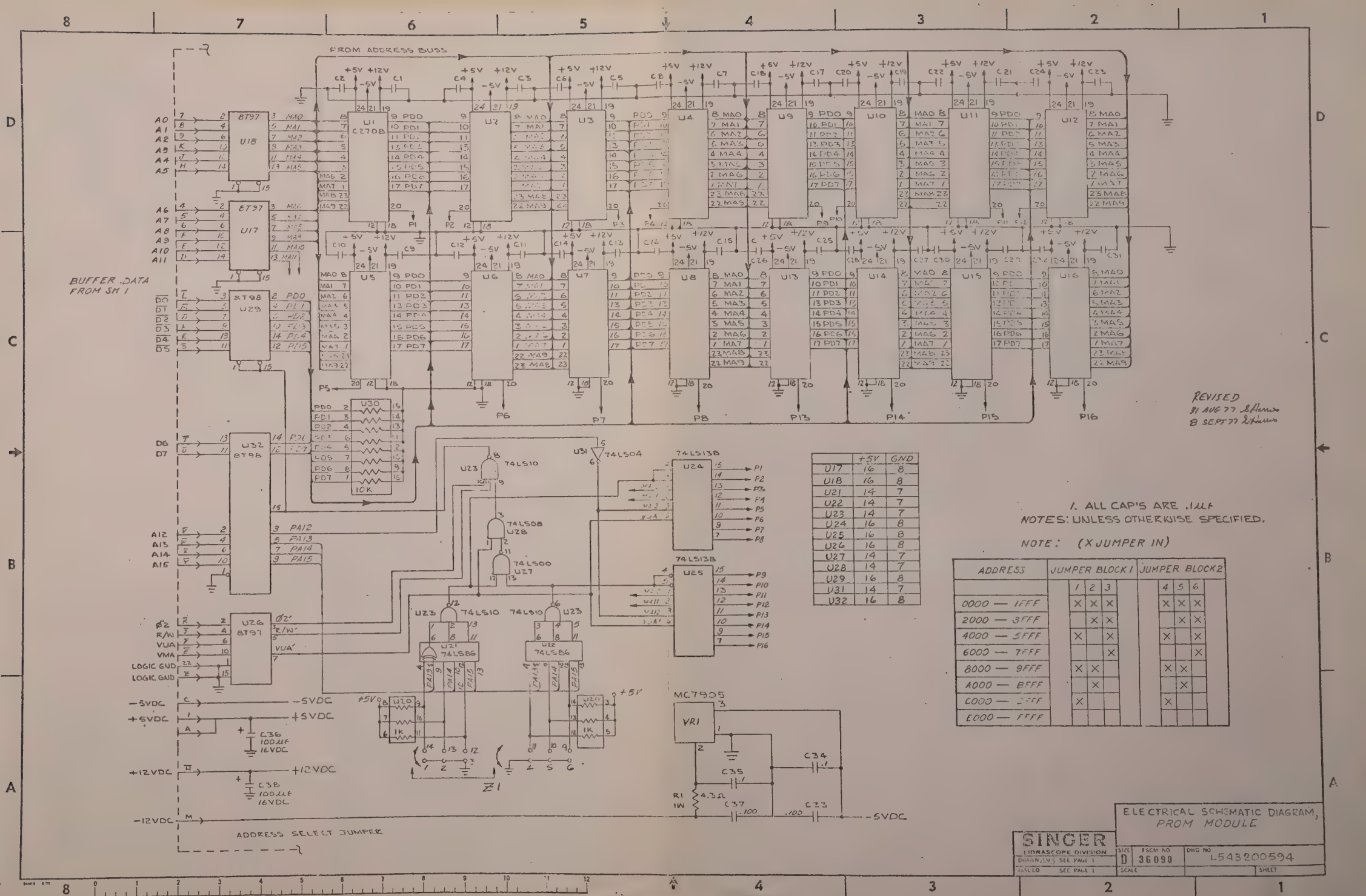
23	1	H551160403	NUT HEX #4-40
22	2	H955160404	WASHER #4
21	1	H775160405	SCREW #4-40 X 5/16
20	3	L5370000281	IC, HEX INVERTER, TRI-STATE
19	1	T540015701	HEADER ASSY
18	1	L530000174	SOCKET, SAE, 14 PIN
17	16	L530000175	SOCKET, DIP, 24 PIN
16	1	L604007505	RESISTOR, 4.3 OHM, 1W
15	4	L609030156	CAPACITOR, FIXED, TANT, 100UF
14	34	L609002348	CAPACITOR, FIXED, CERAMIC, 0.1UF
13	1	L537000286	VOLTAGE REGULATOR, LINEAR, N.C.
12	1	L537000266	IC, HEX INVERTER (74LS04)
11	1	L537000265	QUAD, 2-IN, NAND GATE (74LS00)
10	1	L537000270	QUAD, 2-IN, AND GATE (74LS02)
9	1	L537000271	TRIPLE, 3-IN, AND GATE (74LS03)
8	2	L566000077	RESISTOR NETWORK (1K OHM)
7	8	L537000280	8K UV ERASABLE PROM
6	2	L537000276	DECODER/MULTIPLEXER, 2-BLINE/74LS138
5	2	L537000274	QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS13)
4	2	L537000282	IC, HEX INVERTER TRI-STATE
3	2	H599160504	PN SPRING, SLOTTED
2	2	L600024575	ELECTOR, CIRCUIT CARD
1	1	L535300594	PRINTED WIRING BOARD

QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
1	1	L535300594	PRINTED WIRING BOARD
2	2	L600024575	ELECTOR, CIRCUIT CARD
4	2	L537000282	IC, HEX INVERTER TRI-STATE
5	2	L537000274	QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS13)
6	2	L537000276	DECODER/MULTIPLEXER, 2-BLINE/74LS138
7	8	L537000280	8K UV ERASABLE PROM
8	2	L566000077	RESISTOR NETWORK (1K OHM)
9	1	L537000271	TRIPLE, 3-IN, AND GATE (74LS03)
10	1	L537000270	QUAD, 2-IN, AND GATE (74LS02)
11	1	L537000265	QUAD, 2-IN, NAND GATE (74LS00)
12	1	L537000266	IC, HEX INVERTER (74LS04)
13	1	L537000286	VOLTAGE REGULATOR, LINEAR, N.C.
14	34	L609002348	CAPACITOR, FIXED, CERAMIC, 0.1UF
15	4	L609030156	CAPACITOR, FIXED, TANT, 100UF
16	1	L604007505	RESISTOR, 4.3 OHM, 1W
17	16	L530000175	SOCKET, DIP, 24 PIN
18	1	L530000174	SOCKET, SAE, 14 PIN
19	1	T540015701	HEADER ASSY
20	3	L5370000281	IC, HEX INVERTER, TRI-STATE
21	1	H775160405	SCREW #4-40 X 5/16
22	2	H955160404	WASHER #4
23	1	H551160403	NUT HEX #4-40

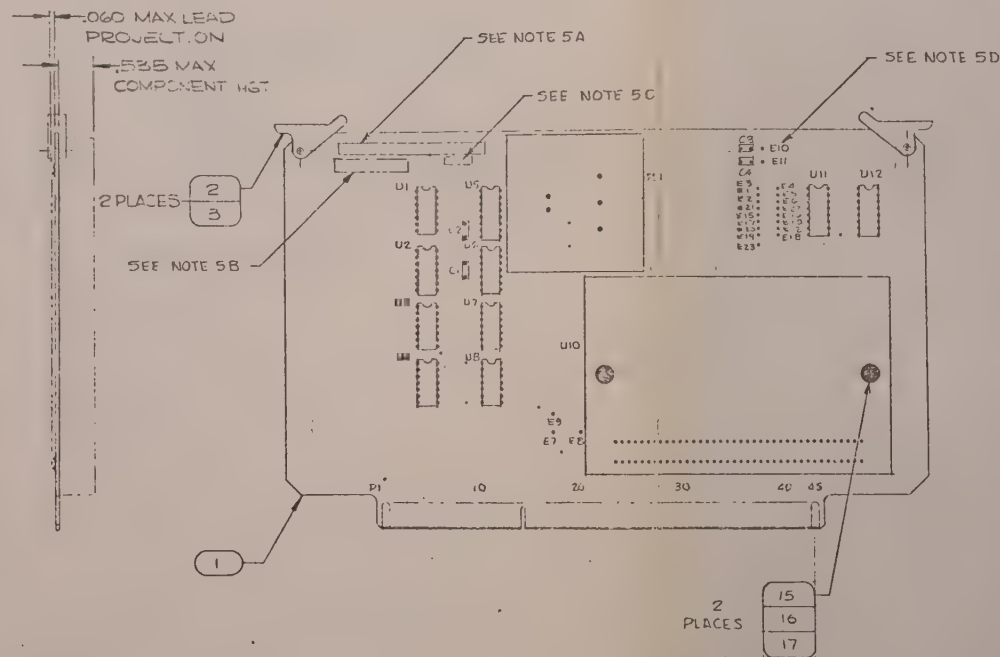
SINGER GLENDALE, CA. 91201

CIRCUIT CARD ASSEMBLY
PROM MODULE

DATE 1/1
REV NO 1
L535 300 594



1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 595
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

[illegible]

1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 200 595

20				
19				
18				
17	2	H955160403	WASHER, FLAT, CRES #4	
16	2	H9655000404	WASHER, LOCK, SPLIT, HELICAL #4	
15	2	H705161003	SCREW, MACH, PAN HD, 4-40 X 3/16	
14	1	L537000265	IC, QUAD, 2-IN, NAND GATE (74LS00)	
13	1	L6090002317	CAPACITOR, FIXED, CERAMIC, 470 PF	
12	2	L537000283	IC, MULTIPLEXER, QUAD, 2-IN, TRI-STATE	
11	3	L537000275	IC, QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS13)	
10	1	L501000290	POWER SUPPLY, DC-DC CONV, DUAL 15VDC	
9	3	L6090002348	CAPACITOR, FIXED, CERAMIC, 0.1UF	
8	1	L566000077	IC, RESISTOR NETWORK (1 KOHM)	
7	1	L444000138	MODULE, ELEC, DATA ACQUISITION SYS	
6	1	L537000273	F-F, DUAL D-TYPE, EDGE TRIG. (74LS74)	
5	1	L5370000267	IC, HEX INVERTER (74LS05)	
4	1	L5370000266	IC, HEX INVERTER (74LS04)	
3	2	H593160904	PIN SPRING, SLOTTED	
2	2	L200024675	EJECTOR, CIRCUIT CARD	
1	1	L225000595	PRINTED WIRING BOARD	

FIND NO.	QTY REQD.	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
				PARTS LIST
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON DIMENSIONS: DECIMAL ANGULAR 2 PLACE .02 SURFACE 3 PLACE .010 TEXTURE 4 PLACE .0005 ✓ HKEY SHARP EDGES MAX.			PAN CHNC APVD	SINGER GLENDALE, CA. 91 LIBRASCOPE DIVISION
MATERIAL			CONTRACT NO.	JIRCUIT CARD ASSEMBLY DATA ACQUISITION MODEL
			SHEET NO. 30090	QTY NO. L535 300 50
			SCALE 1:1	SHEET 1

SINGER GLENDALE, CA. 91201
LIBRASCOPE DIVISION

CIRCUIT CARD ASSEMBLY
DATA ACQUISITION MODULE

SIZE	FSCM NO	DWG NO
0	36090	L535 300 595

ENGINEERING ORDER ☒

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title CIRCUIT CARD ASSY DATA ACQUISITION MODULE					Customer No. —		Librascope No. L535300595		Revision 2	
Next Assembly COMPUTER PROGRAMMER MODEL CP7					Customer No. of N/A —		Libra. No. of N/A L200024905		Class Chg #	
☐ Multi-Use					Cust. No. of Ser. Item —		Libra. No. of Ser. Item —		Rel Coord BW	
Serialized Item Nomenclature					Cust. No. of End Item —		Libra. No. of End Item —		9-21 77	
End Item Nomenclature CP7					Change Requested on Contract N/A		Change Order		Drawing Change ☒	
Reason for Revision UPDATE DWG					Change Board Date		RFI No.		DCR No.	
Orig. Date M. ALLISON 1756J77					Chair. Eng. Q.C.		ECP No.		D/W No.	
Drawn Date —					Proj. Eng. Date *		C.M. Mfg.			
Checked Date M. Allison 1956J77					Proj. Mgr. Date *		Customer Approval N/A		SERIALIZED ITEM	
AFFECTED					DISPOSITION OF ITEM				Concurrence of Class ☐	
YES NO					In Process In Stock N/A In Process N/A Compl.				Immediate Compliance	
Master Layout ☒					☒ ☒ ☒ ☒				Effective Serial in Mfg.	
Eng. Spec. (ES) ☒					Use As Is ☒ ☒ ☒ ☒				Serial Req. Backfit	
Test Equipment ☒					Rework				Optimum Cost	
P.O. Change Req'd. ☒					Scrap (MRB Req'd.)				End Item Not Affected	
Assembly PL Revision Control					Parts Conform				Record Change Only	
Separate PL @ Rev.					Reinspect				Mfg. Job No. Affected	
Drawing @ Rev.					Repair (MRB Req'd)				A8-401	

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT
WAS; "A" SIZE 4 SHEETS

INCORPORATED EO REV 1

SIZE D	PSCM NO 36090	DWG NO L535 300 596
SCALE 1/4"		SHEET 1 OF 1

ENGINEERING ORDER ☒

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

Drawing Title CIRCUIT CARD ASSY ANALOG OUTPUT MODULE				Customer No. —		Librascope No. L535 300 596		Revision 3			
Next Assembly ☐ Multi-Use COMPUTER PROGRAMMER MODEL CP7				Customer No. of N/A —		Libra. No. of N/A L200 024 705		Class Chg II			
Serialized Item Nomenclature				Cust. No. of Ser. Item —		Libra. No. of Ser. Item —		Rel Coord BW			
End Item Nomenclature ☐ Multi-Use CP7				Cust. No. of End Item —		Libra. No. of End Item —		9-30 77			
Reason for Revision TO COMPLETE ASSY DRAWING				Change Requested on Contract N/A				Change Order Drawing Change ☒			
Orig. Date 14. ALLEISON 28 SEPT 77				Drawn Date G. Harris 29 SEPT 77		Checked Date M. Allison 77-9-30		Proj. Eng. Date X			
				Proj. Mgr. Date X		Chair. Eng. Q.C.		RFI No. DCR No.			
						C.M. Mfg.		ECP No. D/W No.			
AFFECTED		YES	NO	DISPOSITION OF ITEM				Customer Approval N/A		SERIALIZED ITEM	
					In Process	In Stock	N/A In Process	N/A Compl.	Concurrence of Class ☐		Effective Serial in Mfg.
Master Layout		☒		Use As Is		☒	☒	☒	Immediate Compliance		
Eng. Spec. (ES)			☒	Rework		☒			Optimum Cost		Serial Req. Backfit
Test Equipment			☒	Scrap (MRB Req'd.)					End Item Not Affected		Serials in Compliance
P.O. Change Req'd.		☒		Parts Conform					Record Change Only		Mfg. Job No. Affected A8-401
Assembly PL Revision Control				Reinspect							
Separate PL @ Rev.				Repair (MRB Req'd.)							
Drawing @ Rev.											

DESCRIPTION OF CHANGE

REVISED AND REDRAWN ON NEW FORMAT

WAS: "A" SIZE 4 SHEETS

INC ED REV 1 & 2

IN P/L: ADD

FIND NO. 26 1 QTY L511 000 366 TRANSIPAD

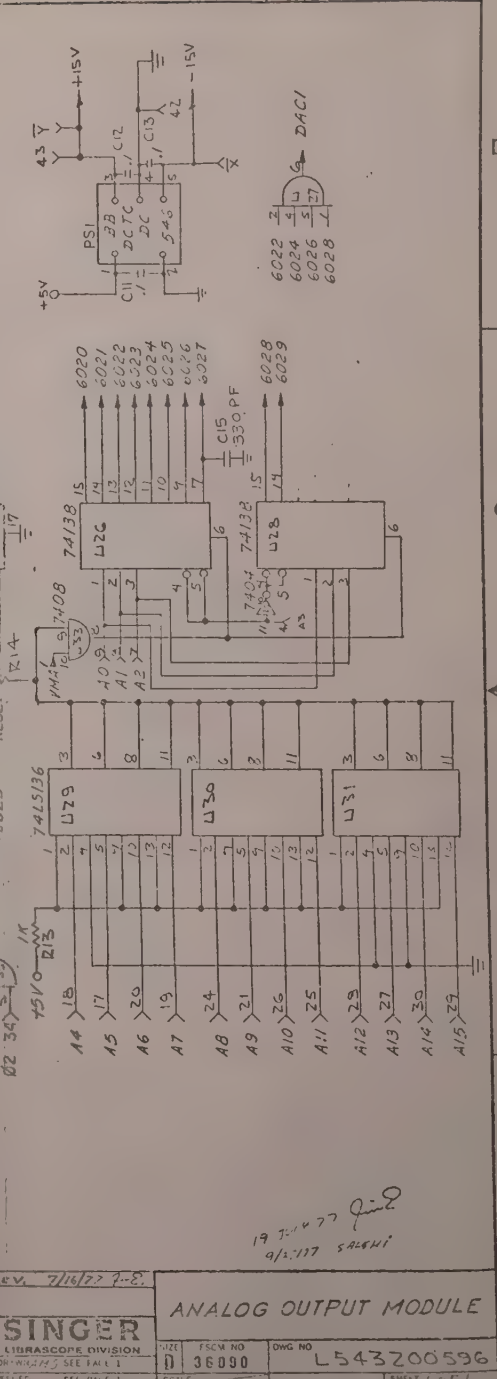
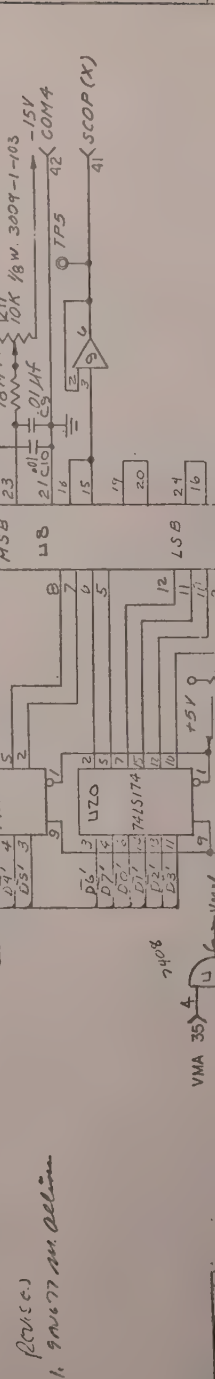
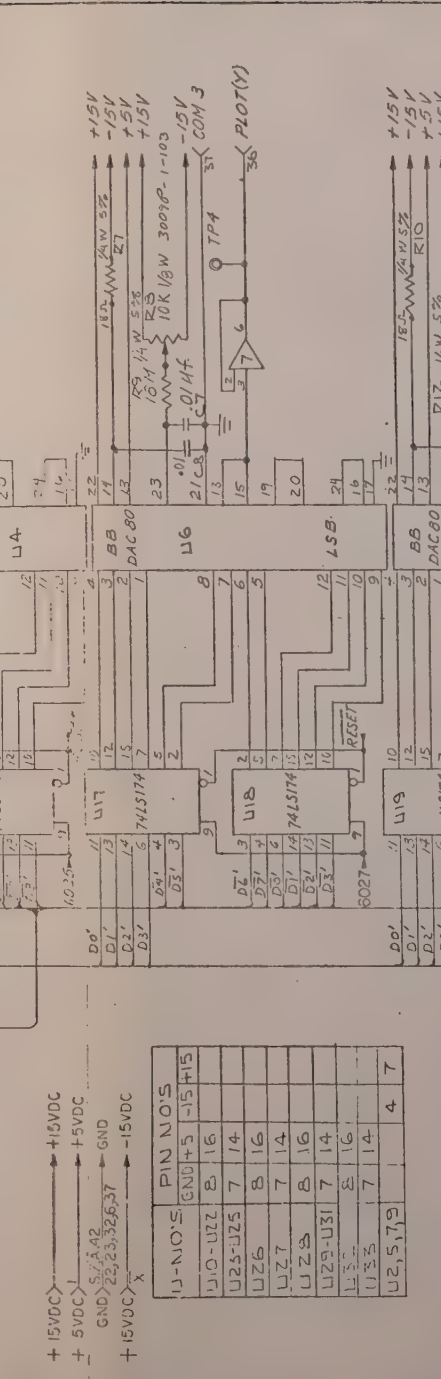
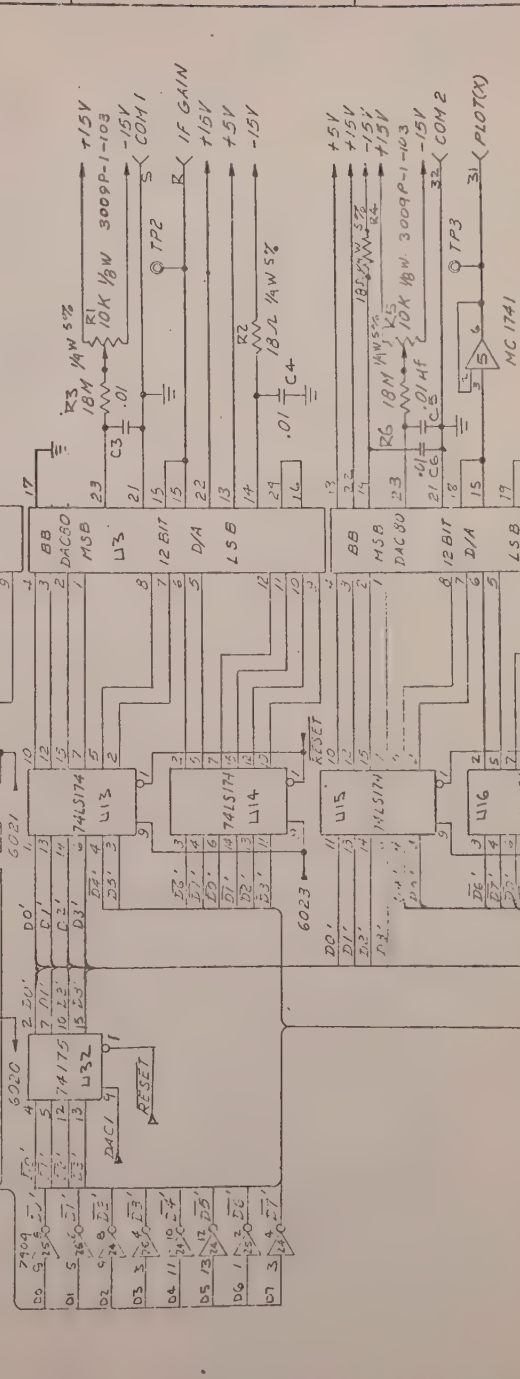
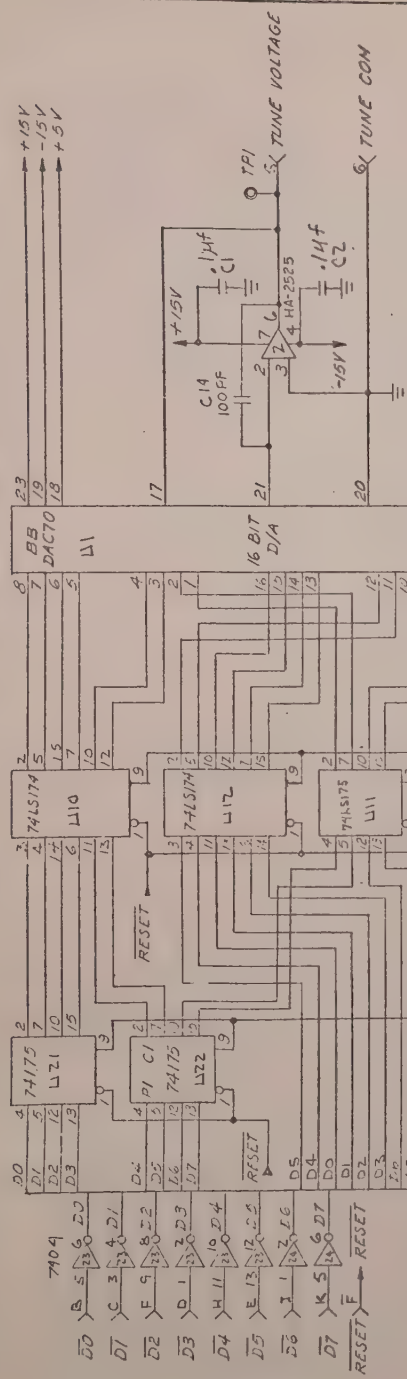
U

C

↓

W

A



+15VDC
+5VDC
GND
-15VDC

U-I/O'S	PIN NO'S
U10-U15	1-15
U16-U21	16-21
U22-U27	22-27
U28-U33	28-33
U34-U39	34-39
U40-U45	40-45
U46-U51	46-51
U52-U57	52-57
U58-U63	58-63
U64-U69	64-69
U70-U75	70-75
U76-U81	76-81
U82-U87	82-87
U88-U93	88-93
U94-U99	94-99
U100-U105	100-105
U106-U111	106-111
U112-U117	112-117
U118-U123	118-123
U124-U129	124-129
U130-U135	130-135
U136-U141	136-141
U142-U147	142-147
U148-U153	148-153
U154-U159	154-159
U160-U165	160-165
U166-U171	166-171
U172-U177	172-177
U178-U183	178-183
U184-U189	184-189
U190-U195	190-195
U196-U201	196-201
U202-U207	202-207
U208-U213	208-213
U214-U219	214-219
U220-U225	220-225
U226-U231	226-231
U232-U237	232-237
U238-U243	238-243
U244-U249	244-249
U250-U255	250-255
U256-U261	256-261
U262-U267	262-267
U268-U273	268-273
U274-U279	274-279
U280-U285	280-285
U286-U291	286-291
U292-U297	292-297
U298-U303	298-303
U304-U309	304-309
U310-U315	310-315
U316-U321	316-321
U322-U327	322-327
U328-U333	328-333
U334-U339	334-339
U340-U345	340-345
U346-U351	346-351
U352-U357	352-357
U358-U363	358-363
U364-U369	364-369
U370-U375	370-375
U376-U381	376-381
U382-U387	382-387
U388-U393	388-393
U394-U399	394-399
U400-U405	400-405
U406-U411	406-411
U412-U417	412-417
U418-U423	418-423
U424-U429	424-429
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U460-U465	460-465
U466-U471	466-471
U472-U477	472-477
U478-U483	478-483
U484-U489	484-489
U490-U495	490-495
U496-U501	496-501
U502-U507	502-507
U508-U513	508-513
U514-U519	514-519
U520-U525	520-525
U526-U531	526-531
U532-U537	532-537
U538-U543	538-543
U544-U549	544-549
U550-U555	550-555
U556-U561	556-561
U562-U567	562-567
U568-U573	568-573
U574-U579	574-579
U580-U585	580-585
U586-U591	586-591
U592-U597	592-597
U598-U603	598-603
U604-U609	604-609
U610-U615	610-615
U616-U621	616-621
U622-U627	622-627
U628-U633	628-633
U634-U639	634-639
U640-U645	640-645
U646-U651	646-651
U652-U657	652-657
U658-U663	658-663
U664-U669	664-669
U670-U675	670-675
U676-U681	676-681
U682-U687	682-687
U688-U693	688-693
U694-U699	694-699
U700-U705	700-705
U706-U711	706-711
U712-U717	712-717
U718-U723	718-723
U724-U729	724-729
U730-U735	730-735
U736-U741	736-741
U742-U747	742-747
U748-U753	748-753
U754-U759	754-759
U760-U765	760-765
U766-U771	766-771
U772-U777	772-777
U778-U783	778-783
U784-U789	784-789
U790-U795	790-795
U796-U801	796-801
U802-U807	802-807
U808-U813	808-813
U814-U819	814-819
U820-U825	820-825
U826-U831	826-831
U832-U837	832-837
U838-U843	838-843
U844-U849	844-849
U850-U855	850-855
U856-U861	856-861
U862-U867	862-867
U868-U873	868-873
U874-U879	874-879
U880-U885	880-885
U886-U891	886-891
U892-U897	892-897
U898-U903	898-903
U904-U909	904-909
U910-U915	910-915
U916-U921	916-921
U922-U927	922-927
U928-U933	928-933
U934-U939	934-939
U940-U945	940-945
U946-U951	946-951
U952-U957	952-957
U958-U963	958-963
U964-U969	964-969
U970-U975	970-975
U976-U981	976-981
U982-U987	982-987
U988-U993	988-993
U994-U999	994-999

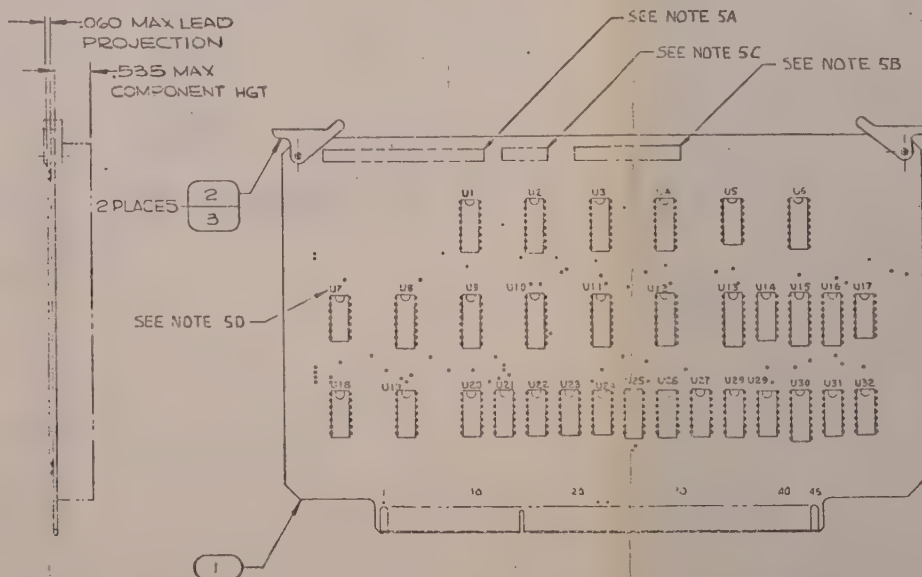
REV. 7/16/77 2-E
1. 9A677 an. del. m.

REV. 7/16/77 2-E	
SINGER	
LIBRARY DIVISION	
SIZE D 36090	DATE NO L543200596
ISSUED SEE PAGE 1	SCALE
SHEET 1 OF 1	

19 7-16-77
9/15/77 SAKEMI

NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 597
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.



REFERENCE DESIGNATION	ITEM NO.
U1	13
U6, U10, U12, U13	12
U7, U1E	11
U30	10
U28, U29, U31, U32	9
U1, U2	8
U24-U26	7
U5, U14, U17	6
U19-U23, U27	5
U3, U4, U15, U16	4

REFERENCES:

1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 200 597

REV		DESCRIPTION	DATE	APPROVED
1	1	INITIALS	10/12/2	

QTY	CODE	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
20			
19			
13			
17			
16			
15			
14			
13	1	L566000077	IC, RESISTOR NETWORK (1K OHM)
12	4	L537000278	FLIP-FLOP, QUAD, D-TYPE (74LS175)
11	2	L537000266	HEX INVERTER (74LS04)
10	1	L566000071	RESISTOR NETWORK (1K OHM)
9	4	L5370002306	HYBRID, QUAD TRANSISTOR (2N2222)
8	2	L537000276	DECODER/MULTIPLEXER 2-5 LINE (74LS132)
7	3	L537000275	QUAD, 2-IN, EXCLUSIVE-OR GATE (74LS130)
6	3	L537000269	HEX BUFFER/DRIVER (7407)
5	6	L537000296	HEX INVERTER, BUFFER/DRIVER (7406)
4	6	L537000277	IC, FLIP-FLOP, HEX, D-TYPE (74LS174)
3	2	H593160904	PIN SPRING, SLOTTED
2	2	L200024675	ELECTOR, CIRCUIT CARD
1	1	L535200597	PRINTED WIRING BOARD

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST				
DIMENSIONS ARE IN INCHES TOLERANCES ON DIMENSIONS DECIMAL ANGULAR ± 2 PLACE ± .02 SURFACE 3 PLACE ± .010 TEXTURE 4 PLACE ± .0005 BREAK SHARP EDGES MAX				SINGER GLENDALE, CA. 91201 LIBRASCOP DIVISION CIRCUIT CARD ASSEMBLY AUXILIARY CONTROLLER SIZE 11 36090 UNG NO L535 300 597 SCALE 1/1

ENGINEERING ORDER ☒

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

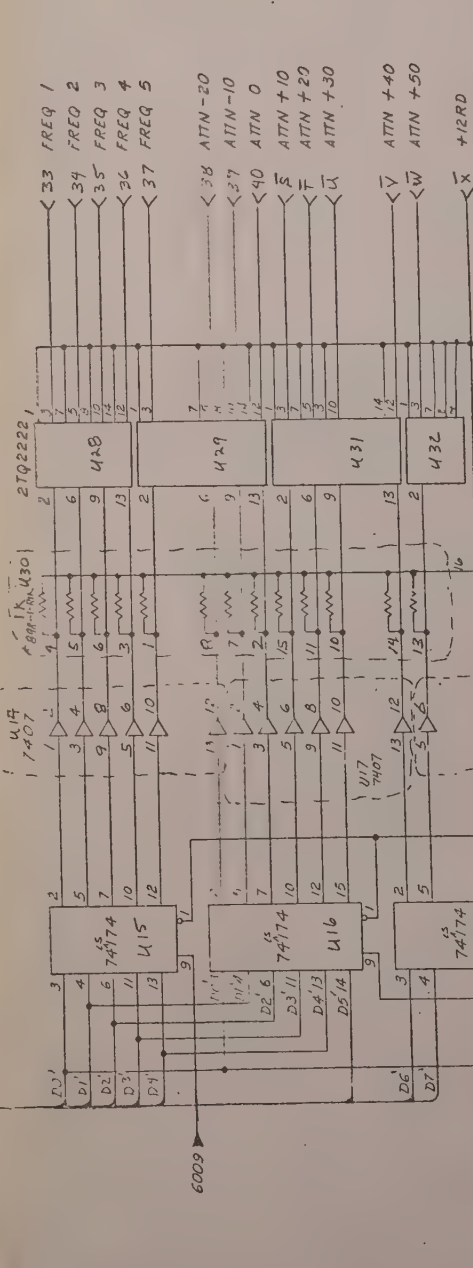
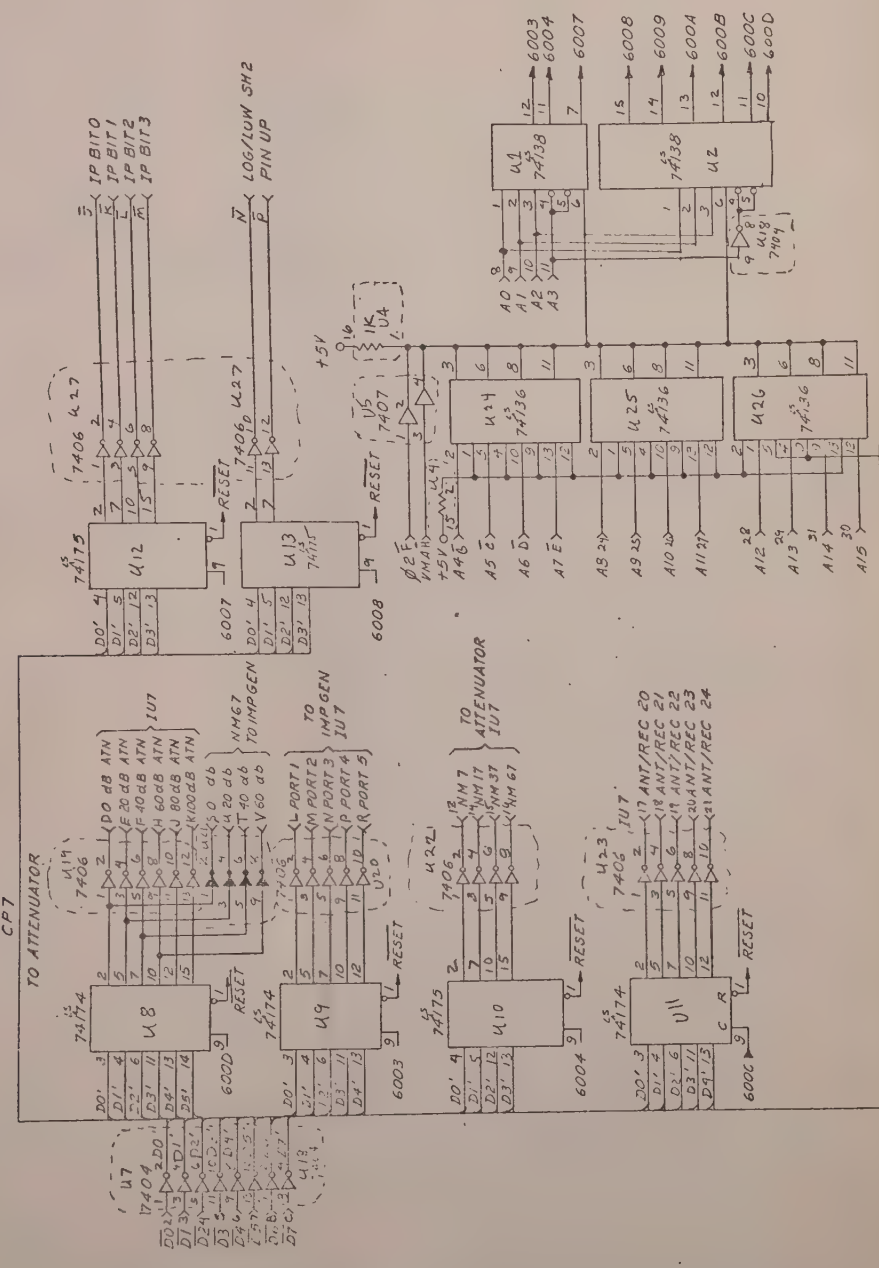
NOR NO. _____
SHEET / OF /

Drawing CIRCUIT CARD ASSEMBLY					Customer No. -		Librascope No. L535300597		Revision 2	
Title AUXILIARY CONTROLLER					Customer No. of N/A -		Libra. No. of N/A L200 024905		Class Chg II	
☐ Multi-Use MODEL CP7					Cust. No. of Ser. Item -		Libra. No. of Ser. Item -		Rel Coord AW	
Serialized Item					Cust. No. of End Item -		Libra. No. of End Item -		9-21 77	
End Item Nomenclature					Change Requested on Contract N/A		Change Order			
☐ Multi-Use CP7					Change Board Date		Drawing Change ☒			
Reason for Revision TO COMPLETE ASS'Y DRAWING					Chair. -		Eng. -		Q.C. -	
Orig. Date M. Allin 1956PT77					Proj. Eng. Date *		Proj. Mgr. Date *		RFI No.	
Drawn Date -					Checked Date M. Allin 2156PT77		C.M. -		DCR No.	
AFFECTED					DISPOSITION OF ITEM				Customer Approval N/A	
YES NO					In Process In Stock N/A In Process N/A Compl.				Concurrence of Class ☐	
Master Layout ☒					Use As Is ☒ ☒ ☒ ☒				Immediate Compliance	
Eng. Spec. (ES) ☒					Rework ☐				Optimum Cost	
Test Equipment ☒					Scrap (MRB Req'd.) ☐				End Item	
P.O. Change Req'd. ☒					Parts Conform ☐				Not Affected	
Assembly PL Revision Control					Reinspect ☐				Record Change	
Separate PL @ Rev.					Repair (MRB Req'd.) ☐				Only	
Drawing @ Rev.									Mfg. Job No. Affected A8-401	

DESCRIPTION OF CHANGE
**REVISED & REDRAWN ON NEW FORMAT
WAS: "A" SIZE 4 SHEETS**

INCORPORATED EO REV 1

A B C D

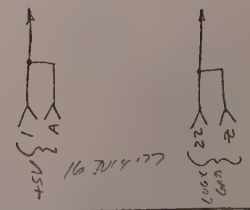


U-NO'S	PIN NO'S
U5, U7, U14, U17 THRU U27	7 14
U1, U2, U3, U6, U8 THRU U13, U15, U16	8 16

REVISED
27 MAY 77 PM OLLIN
UNITS START IN
TOWERS IN 1977
31 AUG 77 JEFFREY

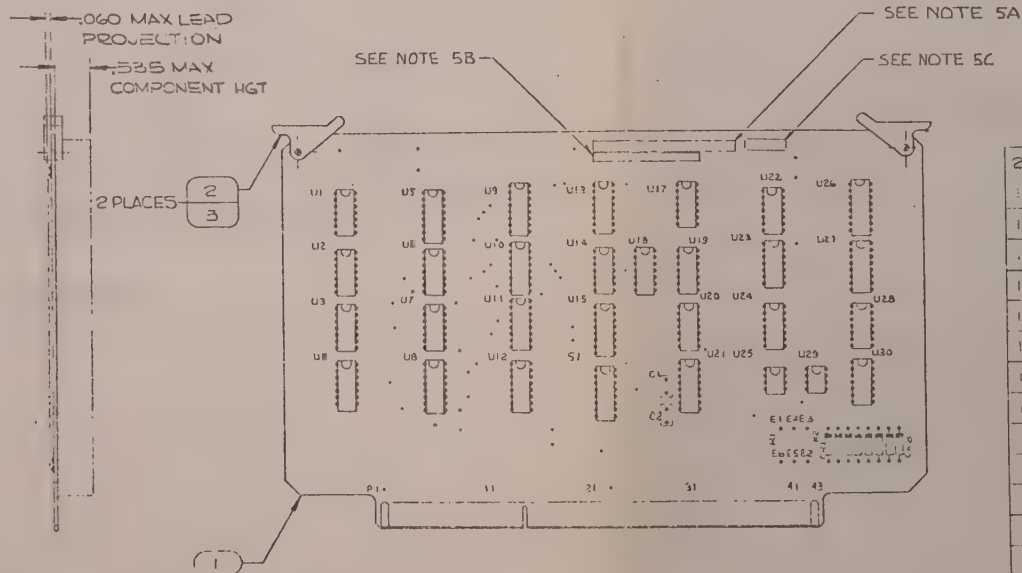
SINGER			
LIBRARY DIVISION			
SIZE	PCOM NO	DWG NO	
D	36090	L 543 200 597	
ISSUED		SCALE	
5/1/77		THREE	

ELECTRICAL SCHEMATIC OPERATOR
AUXILIARY CONTROLLER



NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 598
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.



REFERENCE DESIGNATION	ITEM NO.
U23, U24	20
U5, U9, U10	19
S1	18
C1, C2	17
U25, U29	16
U6	15
U8, U15	14
U1, U2, U3	13
U26, U27	12
U13	11
C21 - C28	10
U17, U19, U28, U30	9
U21	8
U7, U14	7
U22	5
U4, U16, U20	5
U11, U12	4

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 200 598

QTY	REQD	CODE	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
20	2		TS37012002	IC, FET SWITCH DRIVER
19	3		L537000 278	IC, QUAD FLIP FLOP, D-TYPE (74LS175)
13	1		L507001889	SWITCH
17	2		L607002348	CAPACITOR, .1uF ±10% 50V
16	2		L537000 285	IC, OPERATIONAL AMPLIFIER
15	1		L537000 273	IC, DUAL FLIP FLOP, D-TYPE (74LS174)
14	2		L537000 276	IC, DECODER/MULTIPLEXER 2x8 LINE (74LS148)
13	3		L537000 275	IC, QUAD 2 IN EXCLUSIVE OR GATE (74LS136)
12	2		L560000083	IC, RESISTOR NETWORK 3.7K
11	1		L563000077	IC, RESISTOR NETWORK 1K
10	8		L531003175	DIODE (IN914)
9	4		L537000 206	IC, HYBRID QUAD TRANSISTOR
8	1		L537000 284	IC, QUAD SPST ANALOG SW
7	2		L537000 269	IC, HEX BUFFER / DRIVER (7407)
6	1		L537000 268	IC, HEX INVERTER (7406)
5	3		L537000 266	IC, HEX INVERTER (74LS04)
4	2		L531000 277	IC, HEX FLIP FLOP, D-TYPE (74LS123)
3	2		HE55160904	PIN SPRINGS, SLOTTED
2	2		L200024678	EJECTOR, CIRCUIT CARD
1	1		L535200598	PRINTED WIRING BOARD

FIND NO	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST				
SINGER GLENDALE, CA. 91201				
LIBRARY DIVISION				
CIRCUIT CARD ASSEMBLY				
EMI METER CONTROLLER				
SHEET NO. 1		TSCM NO. 36099		DWG NO. L535 300 598
SCALE 1/1		SHEET 1		OF 1

UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES	
TOLERANCES ON DIMENSIONS	
2 PLACE ± .02	DECIMAL ANGULAR ±
3 PLACE ± .010	SURFACE TEXTURE
4 PLACE ± .0005	BREAK SHARP EDGES
MATERIAL	
NEXT ASSY	USED ON
APPLICATION	

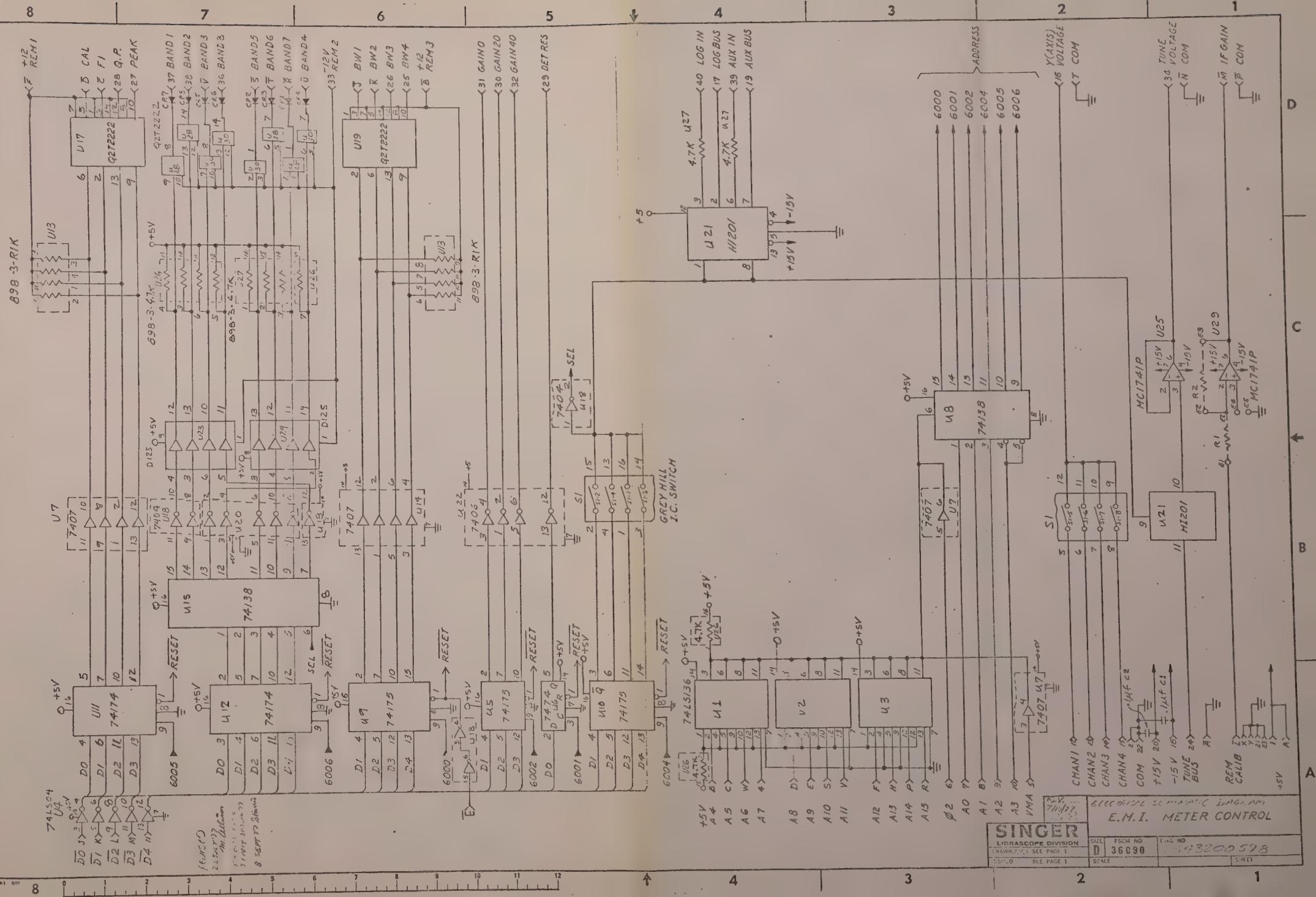
ENGINEERING ORDER ☒NOTICE OF REVISION ☐SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090NOR NO. _____
SHEET 1 OF 1

Drawing CIRCUIT CARD ASS'Y Title EMI METER CONTROLLER					Customer No. —		Librascope No. L535300598		Revision 2		
Next Assembly COMPUTER PROGRAMMER ☐ Multi-Use MODEL CP7					Customer No. of N/A —		Libra. No. of N/A L200024905		Class Chg II		
Serialized Item Nomenclature					Cust. No. of Ser. Item —		Libra. No. of Ser. Item —		Rel Coord BW		
End Item Nomenclature ☐ Multi-Use CP7					Cust. No. of End Item —		Libra. No. of End Item —		9-21 77		
Reason for Revision TO COMPLETE ASS'Y DRAWING					Change Requested on Contract NIA				Change Order		
					Change Board Date				Drawing Change ☒		
Orig. Date		Drawn Date		Checked Date		Proj. Eng. Date		Proj. Mgr. Date		Chair. Eng. Q.C.	
M. ALLISON 16 SEP 77		P.W. 16 SEP 77		M. ALLISON 16 SEP 77		*		*		C.M. Mfg.	
AFFECTED		YES	NO	DISPOSITION OF ITEM				Customer Approval NIA		SERIALIZED ITEM	
					In Process	In Stock	N/A In Process	N/A Compl.	Concurrence of Class ☐		Effective Serial in Mfg.
Master Layout		☒							Immediate Compliance		
Eng. Spec. (ES)			☒	Use As Is	☒	☒	☒	☒	Optimum Cost		Serial Req. Backfit
Test Equipment			☒	Rework					End Item		
P.O. Change Req'd.		☒		Scrap (MRB Req'd.)					Not Affected		Serials in Compliance
Assembly PL Revision Control				Parts Conform					Record Change Only		
Separate PL @ Rev.				Reinspect							
Drawing @ Rev.				Repair (MRB Req'd.)							Mfg. Job No. Affected
DESCRIPTION OF CHANGE		REVISED & REDRAWN ON NEW FORMAT									

WAS: "A" SIZE 4 SHEETS

INC EO REV 1

A8-401



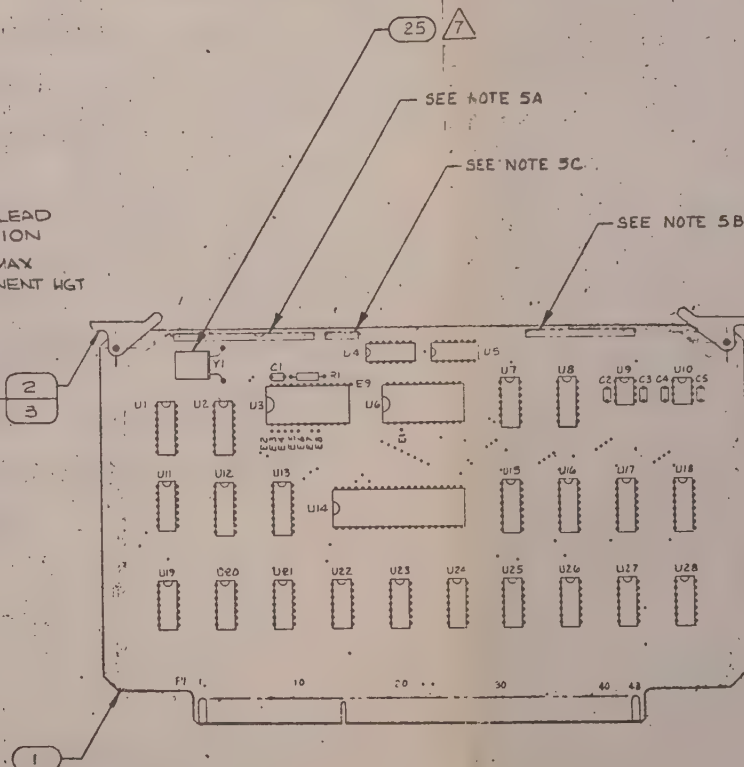
NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 615
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

△ BOND FIND NO. 19 TO FIND NO. 1 USING FIND NO. 25.

←.060 MAX LEAD PROJECTION
←.535 MAX COMPONENT HGT

2 PLACES
2
3



REFERENCE DESIGNATION	ITEM NO.
R1	21
C1, C2, C3, C4, C5	20
Y1	19
U1	22
U25	14
U22, U23, U24	12
U19, U20	15
U15, U16, U17, U18	17
U14	8
U12, U13	18
U9, U10	9
U8	11
U7, U26, U27, U28	13
U6	7
U5	5
U4	6
U3	4
U2	16
U1	10

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 200 615

REV		REVISIONS		DATE		APPROVED	
ZONE	REV	DESCRIPTION		DATE		APPROVED	
2	INC	EO 1 & 2		11-10-7		[Signature]	

25	AR	L101 000 896	URETHANE BOND
24	2	H593 160 904	MOUNTING PIN
23	2	L200 024 675	EJECTOR, CIRCUIT CARD
22	1	L566 000 079	RESISTOR NETWORK, 1KΩ
21	1	L604 005 082	RESISTOR, 1KΩ, ±5%, 1/4W
20	5	L609 002 348	CAPACITOR, .1UF
19	1	L200 024 680	CRYSTAL, 1.8432 MHz (MP018)
18	2	L537 000 285	IC, LINEAR AMPLIFIER, OPERATIONAL (MC1741B)
17	4	L537 000 298	IC, REGISTER, 4 BIT D TYPE (74LS173)
16	1	L537 000 276	IC, DECODER/MULTIPLEXER (74LS138)
15	3	L537 000 275	IC, QUAD 2-IN, EXCLUSIVE-OR GATE (74LS136)
14	1	L537 000 269	IC, HEX BUFFER/DRIVER (7407)
13	4	L537 000 266	IC, HEX INVERTER (74LS04)
12	3	L537 000 296	IC, HEX INVERTER, BUFFER/DRIVER (7406)
11	1	L537 000 270	IC, QUAD 2-INPUT, AND GATE (74LS08)
10	1	L537 000 281	IC, HEX INVERTER, TRI-STATE (8T97)
9	2	L537 000 294	IC, HEX BUFFER, TRI-STATE (8T26)
8	1	L537 000 290	IC, ADAPTER, PERIPHERAL (MC6820)
7	1	L537 000 302	IC, ADAPTER, COMMUNICATIONS (MC6850)
6	1	L537 000 300	IC, RECEIVER, QUAD LINE (MC1489AL)
5	1	L537 000 299	IC, DRIVER, QUAD LINE (MC1488L)
4	1	L537 000 301	IC, GENERATOR, BIT RATE (MC14411F)
3	2	H593 160 904	PIN SPRING, SLOTTED
2	2	L200 024 675	EJECTOR, CIRCUIT CARD
1	1	L535 200 615	PRINTED WIRING BOARD

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
----------	----------	------------	-----------------------------	-----------------------------

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DIMENSIONS
DECIMAL ANGULAR =
2 PLACE ±.02 SURFACE
3 PLACE ±.010 TEXTURE
4 PLACE ±.0005
BREAK SHARP EDGES MAX

LIBRARY SCOPE DIVISION

SINGER OLENDALE, CA. 91201

CIRCUIT CARD ASSEMBLY
INTERFACE MODULE

CONTRACT NO.

SIZE FSCM NO DWG NO

D 36090 L535 300 615

SCALE 1/1 SHEET 1 OF 1

4200 024 675	CP7
NEXT ASSY	USED ON
APPLICATION	

ENGINEERING ORDER ☒NOTICE OF REVISION ☐SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090NOR NO. _____
SHEET 1 OF 1

Drawing Title CIRCUIT CARD ASSEMBLY INTERFACE MODULE				Customer No. _____		Librascope No. L535 300 615		Revision 2	
Next Assembly COMPUTER PROGRAMMER MODEL CPT				Customer No. of N/A _____		Libra. No. of N/A L200 024 705		Class Chg II	
☐ Multi-Use				Cust. No. of Ser. Item _____		Libra. No. of Ser. Item _____		Rel Coord JB	
Serialized Item Nomenclature _____				Cust. No. of End Item _____		Libra. No. of End Item _____		10-7-77	
End Item Nomenclature ☐ Multi-Use				Change Requested on Contract N/A				Change Order Drawing Change ☒	
Reason for Revision TO COMPLETE ASSEMBLY DWG				Change Board Date _____				RFI No. DCR No.	
Orig. Date M. ALLISON 77-10-3		Drawn Date 5 OCT 77		Checked Date M. Allison 77-10-7		Proj. Eng. Date _____		Proj. Mgr. Date _____	
AFFECTED		YES NO		DISPOSITION OF ITEM				Customer Approval Concurrence of Class ☒	
Master Layout		☒		In Process In Stock N/A In Process N/A Compl.				SERIALIZED ITEM	
Eng. Spec. (ES)		☒		☒ ☒ ☒ ☒				Effective Serial in Mfg.	
Test Equipment		☒		☒ ☒ ☒ ☒				Serial Req. Backfit	
P.O. Change Req'd.		☒		☒ ☒ ☒ ☒				Serials in Compliance.	
Assembly PL Revision Control		☒		☒ ☒ ☒ ☒				Mfg. Job No. Affected	
Separate PL @ Rev.		☒		☒ ☒ ☒ ☒				A8-401	
Drawing @ Rev.		☒		☒ ☒ ☒ ☒					

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT

WAS: "A" SIZE 4 SHEETS
INC EO REV 1

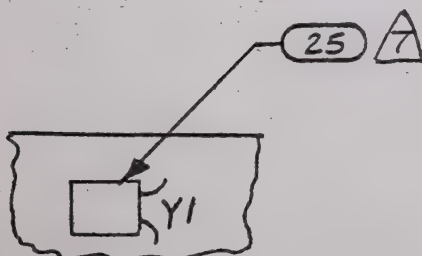
ADD TO PARTS LIST:

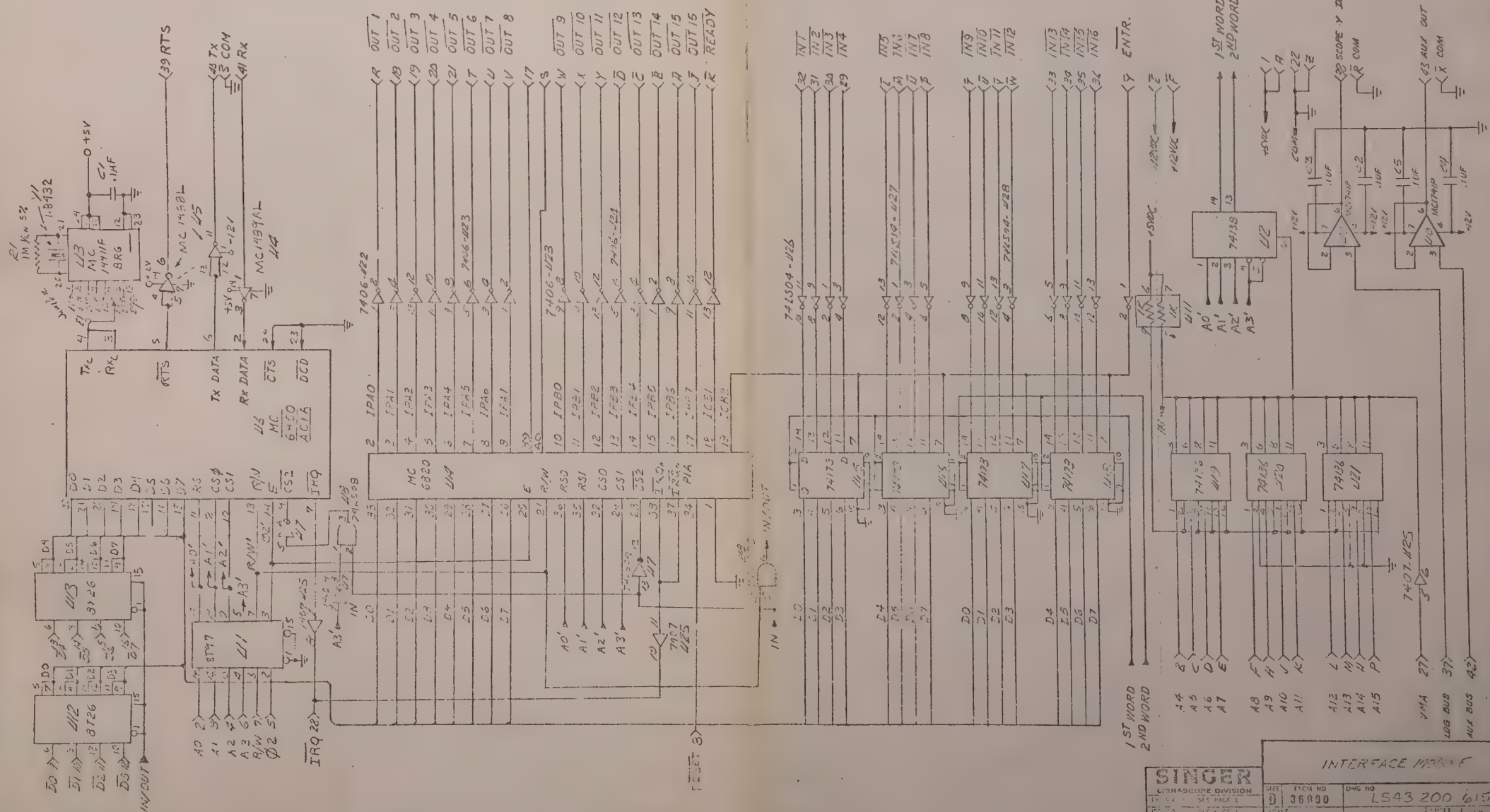
25	AR	L101 000 896	URETHANE BOND
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ADD TO NOTES:

7 BOND FIND NO. 19 TO FIND NO. 1 USING FIND NO. 25.

ADD TO F/D, ZN 5/C:

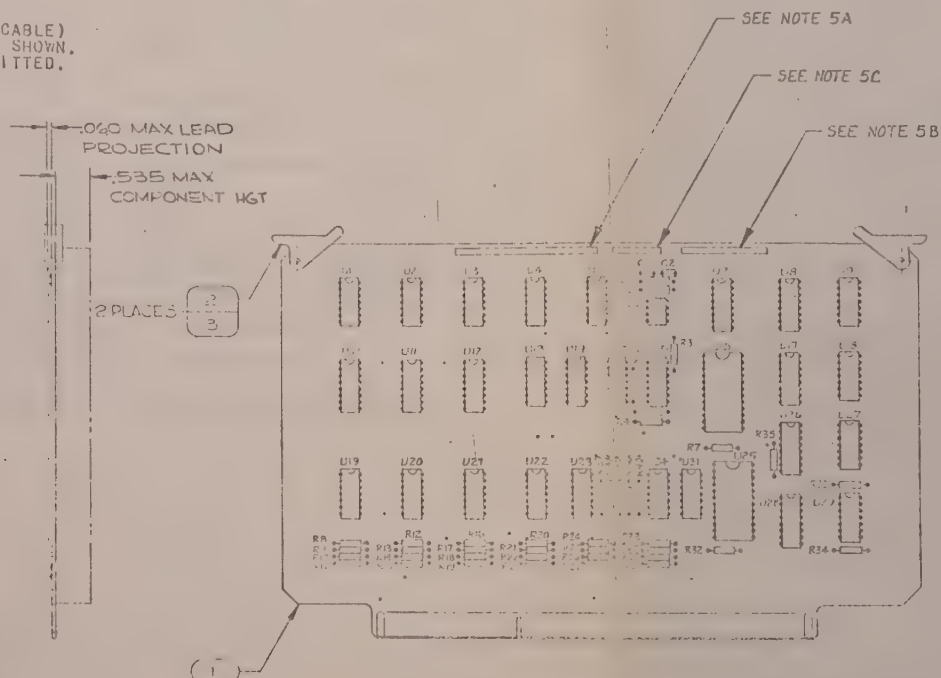




1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840.

| 7070 | | REV | | DESCRIPTION | DATE | BY |
|------|---|-----|--|--------------|---------|-----|
| | 2 | | | INC EO 1 & 2 | 11/1/83 | ... |

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENTS.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 3609C ASSY L535 300 G16
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.



| | |
|----------------|----|
| R3b-R40 | 22 |
| 21-231 | 22 |
| R41, R42-R45 | 21 |
| R6 | 20 |
| R5 | 19 |
| C1-C4 | 18 |
| C1, C2 | 17 |
| R21, R22, R21 | 14 |
| R6, R23 | 15 |
| R25 | 12 |
| R17-R24 | 10 |
| R40 | 11 |
| R15 | 9 |
| U13, U11, U12 | 4 |
| U1, U12, U27 | 16 |
| U1 | 13 |
| U7, U7 | 8 |
| U6 | 7 |
| U1, U1, U1, U4 | 6 |
| U1 | 1 |

1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. L543 200 6/16

| | | | |
|----|----|-----------------|--|
| 23 | 5 | L604 005 060 | RESISTOR, 120 Ω , $\pm$ 5%, 1/4W |
| 22 | 24 | L604 005 055 | RESISTOR, 70K Ω , $\pm$ 5%, 1/4W |
| 21 | 5 | L604 005 087 | RESISTOR, 1K Ω , $\pm$ 5%, 1/4W |
| 20 | 1 | L604 005 089 | RESISTOR, 2K Ω , $\pm$ 5%, 1/4W |
| 19 | 1 | L604 005 098 | RESISTOR, 4.7K Ω , $\pm$ 5%, 1/4W |
| 18 | 4 | L604 005 085 | RESISTOR, 200 Ω , $\pm$ 5%, 1/4W |
| 17 | 2 | L60 007 243 | CAPACITOR, 1UF, 50V, 50V |
| 16 | 3 | L537 000 215 | IC, QUAD 555, PRECISION CMOS |
| 15 | 2 | L537 000 282 | IC, HEX INVERTER, PRECISION CMOS |
| 14 | 3 | L537 000 269 | IC, HEX BUFFER/DRIVER (7400) |
| 13 | 1 | L537 000 281 | IC, HEX INVERTER, TRI-STATE CMOS |
| 12 | 1 | L537 000 311 | IC, 4000 CMOS LOGIC, 14-PIN |
| 11 | 1 | L537 000 312 | IC, 4000 CMOS LOGIC, 14-PIN |
| 10 | 6 | L537 000 310 | IC, LINEAR DRIVER, QUAD (7443) |
| 9 | 1 | L537 000 306 | IC, QUAD TRANSISTOR (74101) |
| 8 | 2 | L537 000 314 | IC, COUNTER, UP/DOWN (74163) |
| 7 | 1 | L537 000 315 | IC, LINEAR TIMER (74155) |
| 6 | 4 | L537 000 303 | IC, 8-INPUT NAND GATE (74151) |
| 5 | 3 | L537 000 276 | IC, 4-INPUT AND GATE (74151) |
| 4 | 5 | L537 000 176 | IC, 6000V/4000V, 14-PIN |
| 3 | 2 | L537 000 176 | PN, SPRING, ELECTRO |
| 2 | 2 | L537 000 240 75 | SELECTOR, CIRCUIT BOARD |
| 1 | 1 | L537 000 240 75 | SELECTOR, CIRCUIT BOARD |

[illegible]

ENGINEERING ORDER ☒NOTICE OF REVISION ☐SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090NOR NO. _____
SHEET 1 OF 1

| | | | | | | | | | |
|--|--|-----------------|--|---|--|--|--|---|--|
| Drawing Title
CIRCUIT CARD ASSEMBLY
DISPLAY DRIVER | | | | Customer No.
— | | Librascope No.
L535300616 | | Revision
2 | |
| Next Assembly
COMPUTER PROGRAMMER
MODEL CP7 | | | | Customer No. of N/A
— | | Libra. No. of N/A
L200029705 | | Class Chg
11 | |
| Serialized Item
Nomenclature | | | | Cust. No. of Ser. Item
— | | Libra. No. of Ser. Item
— | | Rel Coord
311 | |
| End Item Nomenclature
CP7 | | | | Cust. No. of End Item
— | | Libra. No. of End Item
— | | 10-6
77 | |
| Reason for Revision
TO COMPLETE ASSY DRAWING | | | | Change Requested on Contract
N/A | | | Change Order | | |
| | | | | Change Board Date | | | Drawing Change ☒ | | |
| Orig. Date | | Drawn Date | | Checked Date | | Proj. Eng. Date | | Proj. Mgr. Date | |
| 4 OCT 77 | | 4 OCT 77 | | 4 OCT 77 | | 4 OCT 77 | | 4 OCT 77 | |
| AFFECTED | | | | DISPOSITION OF ITEM | | | | Customer Approval | |
| YES NO | | | | In Process In Stock N/A In Process N/A Compl. | | | | Concurrence of Class ☐ | |
| Master Layout | | | | Use As Is | | | | Immediate Compliance | |
| Eng. Spec. (ES) | | | | Rework | | | | Optimum Cost | |
| Test Equipment | | | | Scrap (MRB Req'd.) | | | | End Item | |
| E.O. Change Req'd. | | | | Parts Conform | | | | Not Affected | |
| Assembly PL Revision Control | | | | Reinspect | | | | Record Change | |
| Separate PL @ Rev. | | | | Repair (MRB Req'd.) | | | | Only | |
| Drawing @ Rev. | | | | | | | | Mfg. Job No. Affected | |

DESCRIPTION OF CHANGE

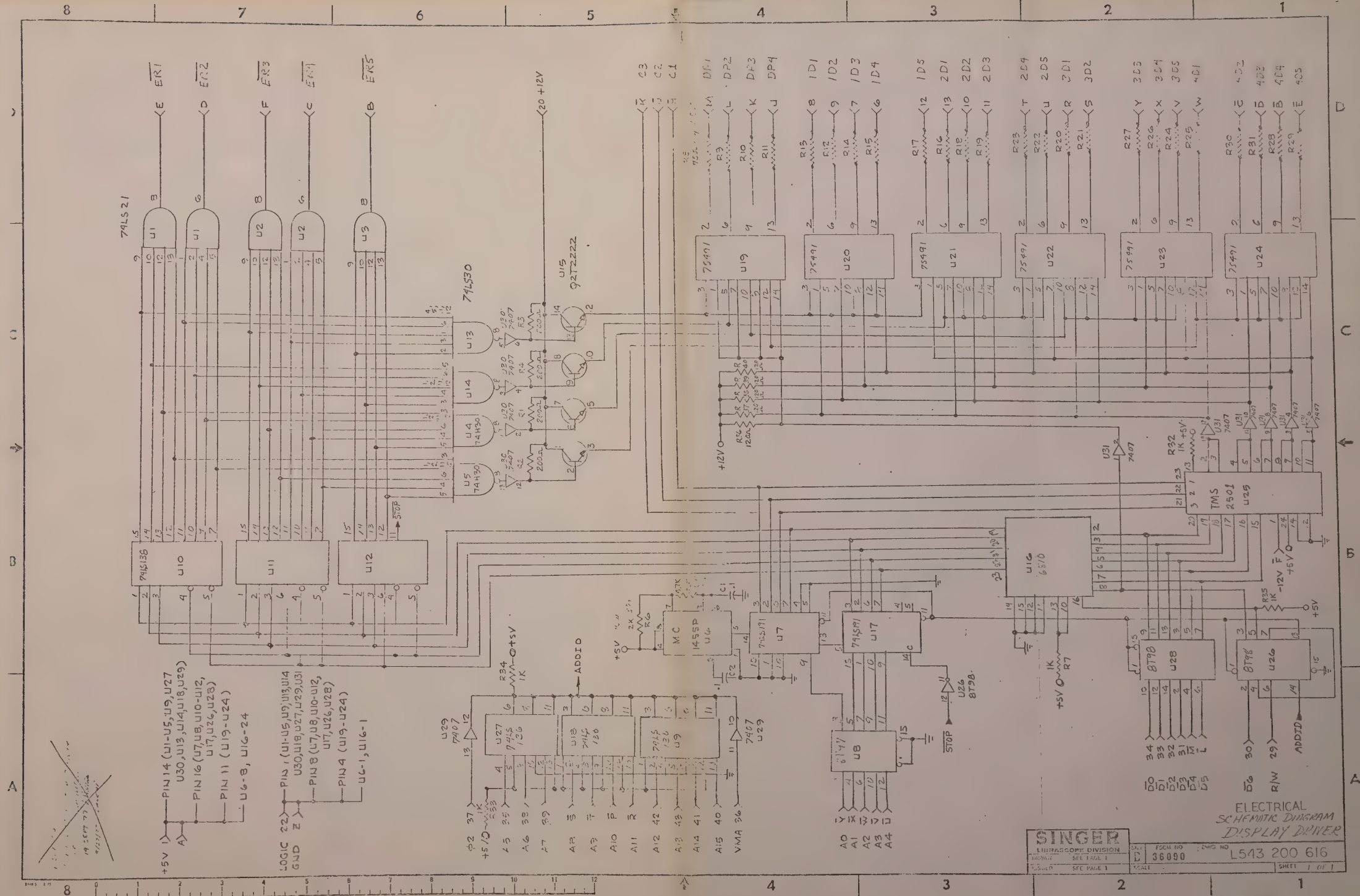
REVISED & REDRAWN ON NEW FORMAT
WAS: "A" SIZE, 4 SHEETS (FIND NO.'S CHANGED)

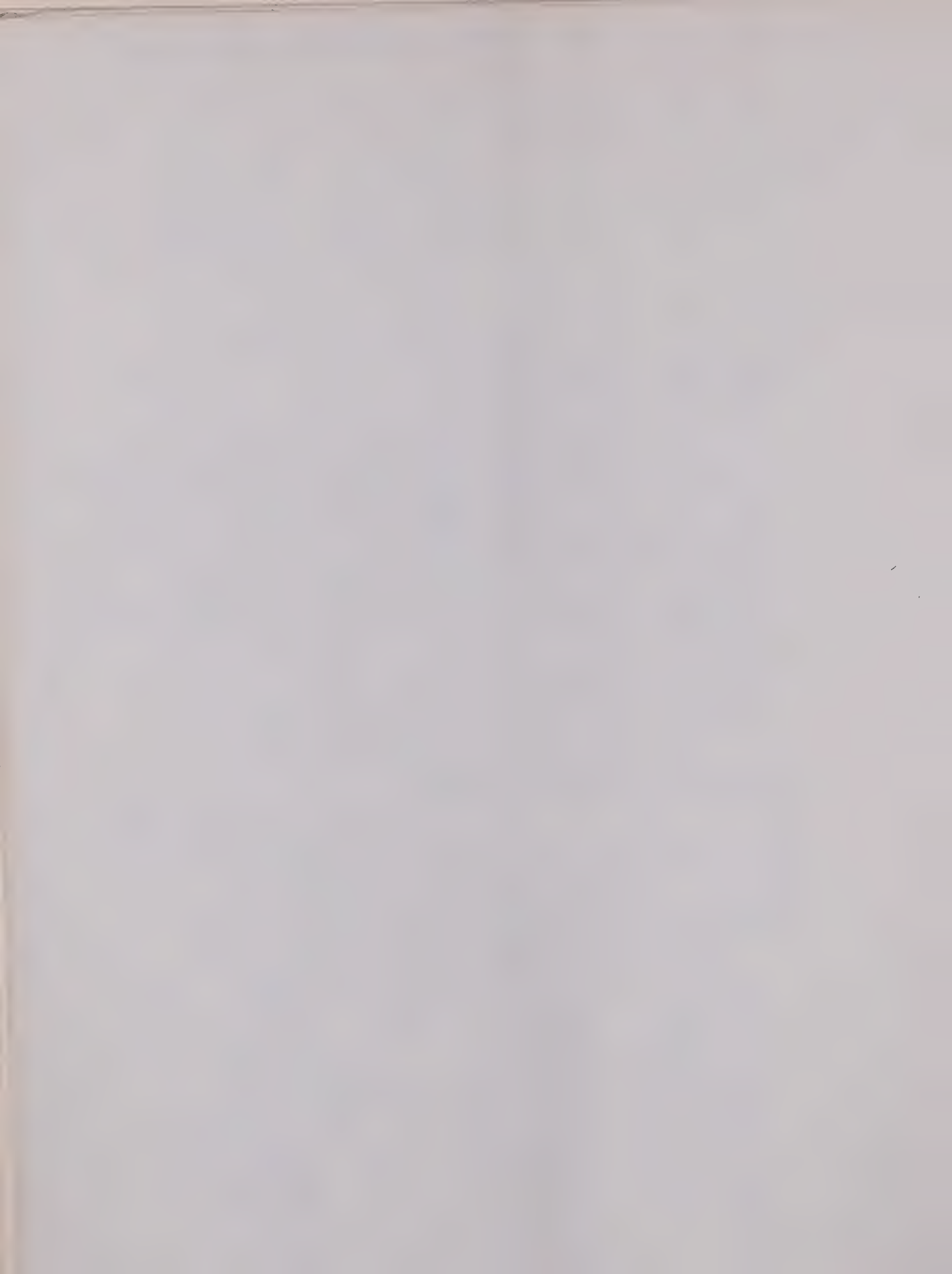
FIND NO. 13; IS: 1 QTY
S/B: 3 QTY

FIND NO. 22; IS: 7 QTY
S/B: 5 QTY

ADD 4 QTY, L604 005 065, RESISTOR, 200 Ω , $\pm 5\%$, 1/4 W
ADD 5 QTY, L604 005 060, RESISTOR, 120 Ω , $\pm 5\%$, 1/4 W



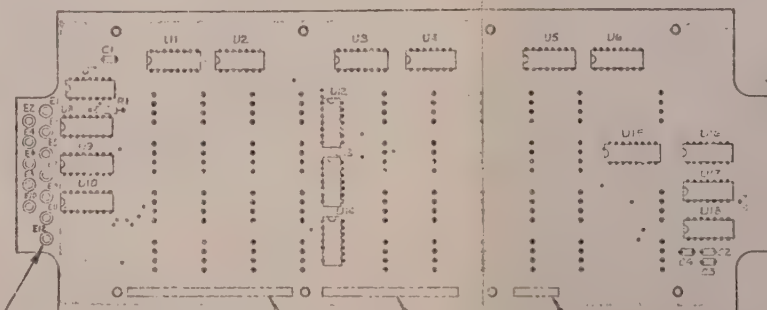




NOTES: UNLESS OTHERWISE SPECIFIED

1. SOLDER IN ACCORDANCE WITH MIL-STD-454 REQUIREMENT 5.
2. ELECTRICAL COMPONENTS ARE IDENTIFIED BY CORRESPONDING REFERENCE DESIGNATIONS AND PARTS LIST.
3. ELECTRICAL COMPONENTS SHALL BE ORIENTED AS SHOWN.
4. ELECTRICAL COMPONENTS NOT HELD IN PLACE BY MECHANICAL MEANS SHALL BE MOUNTED .03 MAX FROM SURFACE OF PRINTED WIRING BOARD.
5. MARK APPROX WHERE SHOWN, IN ACCORDANCE WITH MIL-STD-130, USING WHITE NON-CONDUCTIVE INK:
 - A. 36090 ASSY L535 300 618
 - B. SERIAL NO. (AS ASSIGNED)
 - C. LATEST REVISION (AS APPLICABLE)
 - D. CHARACTERS AND SYMBOLS AS SHOWN.
6. CONDUCTOR PATTERN PARTIALLY OMITTED.

.060 MAX LEAD PROJECTION
.350 MAX COMPONENT HGT



14 SWAGE FAR SIDE
12 PLACES

SEE NOTE 5A

SEE NOTE 5B

SEE NOTE 5C

| | |
|------|----|
| U1 | 14 |
| U2 | 13 |
| U3 | 12 |
| U4 | 11 |
| U5 | 10 |
| U6 | 9 |
| U7 | 8 |
| U8 | 7 |
| U9 | 6 |
| U10 | 5 |
| U11 | 4 |
| U12 | 3 |
| U13 | 2 |
| U14 | 1 |
| U15 | 14 |
| U16 | 13 |
| U17 | 12 |
| U18 | 11 |
| U19 | 10 |
| U20 | 9 |
| U21 | 8 |
| U22 | 7 |
| U23 | 6 |
| U24 | 5 |
| U25 | 4 |
| U26 | 3 |
| U27 | 2 |
| U28 | 1 |
| U29 | 14 |
| U30 | 13 |
| U31 | 12 |
| U32 | 11 |
| U33 | 10 |
| U34 | 9 |
| U35 | 8 |
| U36 | 7 |
| U37 | 6 |
| U38 | 5 |
| U39 | 4 |
| U40 | 3 |
| U41 | 2 |
| U42 | 1 |
| U43 | 14 |
| U44 | 13 |
| U45 | 12 |
| U46 | 11 |
| U47 | 10 |
| U48 | 9 |
| U49 | 8 |
| U50 | 7 |
| U51 | 6 |
| U52 | 5 |
| U53 | 4 |
| U54 | 3 |
| U55 | 2 |
| U56 | 1 |
| U57 | 14 |
| U58 | 13 |
| U59 | 12 |
| U60 | 11 |
| U61 | 10 |
| U62 | 9 |
| U63 | 8 |
| U64 | 7 |
| U65 | 6 |
| U66 | 5 |
| U67 | 4 |
| U68 | 3 |
| U69 | 2 |
| U70 | 1 |
| U71 | 14 |
| U72 | 13 |
| U73 | 12 |
| U74 | 11 |
| U75 | 10 |
| U76 | 9 |
| U77 | 8 |
| U78 | 7 |
| U79 | 6 |
| U80 | 5 |
| U81 | 4 |
| U82 | 3 |
| U83 | 2 |
| U84 | 1 |
| U85 | 14 |
| U86 | 13 |
| U87 | 12 |
| U88 | 11 |
| U89 | 10 |
| U90 | 9 |
| U91 | 8 |
| U92 | 7 |
| U93 | 6 |
| U94 | 5 |
| U95 | 4 |
| U96 | 3 |
| U97 | 2 |
| U98 | 1 |
| U99 | 14 |
| U100 | 13 |

REFERENCES:
1. ELECTRICAL SCHEMATIC DIAGRAM
DWG NO. LE43 200 618

| | | | |
|----|----|--------------|---|
| 14 | 12 | H948 305 012 | TERMINAL, STUD |
| 13 | 1 | L604 005 082 | RESISTOR, 1K Ω , $\pm 5\%$, 1/4W |
| 12 | 3 | L609 002 317 | CAPACITOR, 270 PF, $\pm 10\%$, 200V |
| 11 | 1 | L609 002 348 | CAPACITOR, .1MF, $\pm 10\%$, 50V |
| 10 | 3 | L566 000 081 | RESISTOR NETWORK, 10K Ω |
| 9 | 2 | L537 000 319 | IC, DUAL 4-INPUT POS AND GATE (7421) |
| 8 | 5 | L537 000 309 | IC, ENCODER, OCTAL, 8-TO-3 LINE (74LS149) |
| 7 | 1 | L537 000 303 | IC, 8-INPUT, NAND GATE (74LS30) |
| 6 | 1 | L537 000 272 | IC, DUAL, 4-INPUT, AND GATE (74LS21) |
| 5 | 1 | L537 000 282 | IC, HEX INVERTER TRI-STATE (8T98) |
| 4 | 1 | L537 000 270 | IC, QUAD 2-INPUT, AND GATE (74LS38) |
| 3 | 1 | L537 000 268 | IC, HEX INVERTER, BUFFER/DRIVER (74LS173) |
| 2 | 2 | L537 000 298 | IC, REGISTER, 4-BIT, D-TYPE (74LS173) |
| 1 | 1 | L535 200 618 | PRINTED WIRING BOARD |

| FIND QTY NO | QTY REQD | CODE IDENT | PART NO. OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION |
|----------------------------|----------|------------|-----------------------------|-----------------------------|
| PARTS LIST | | | | |
| SINGER GLENDALE, CA. 91201 | | | | |
| LIBRASCONE DIVISION | | | | |
| CIRCUIT CARD ASSEMBLY | | | | |
| KEYBOARD | | | | |
| CONTRACT NO. | | | | |
| SHEET NO. 1 OF 1 | | | | |



ENGINEERING ORDER ☒

NOTICE OF REVISION ☐

SINGER
LIBRASCOPE DIVISION
CODE IDENT 36090

NOR NO. _____
SHEET 1 OF 1

| | | | | | | | | | | | |
|--|------|---------------|------------------|-----------------|--|------------|--|------------|--|---|---------|
| Drawing Title
CIRCUIT CARD ASSY KEYBOARD | | | | | Customer No.
_____ | | Librascope No.
L535 300 618 | | Revision
3 | | |
| Next Assembly
☐ Multi-Use COMPUTER PROGRAMMER MODEL CP7 | | | | | Customer No. of N/A
_____ | | Libra. No. of N/A
L200 024 705 | | Class Chg
II | | |
| Serialized Item
Nomenclature | | | | | Cust. No. of Ser. Item
_____ | | Libra. No. of Ser. Item
_____ | | Rel Coord
(30) | | |
| End Item Nomenclature
☐ Multi-Use CP7 | | | | | Cust. No. of End Item
_____ | | Libra. No. of End Item
_____ | | | | |
| Reason for Revision
TO COMPLETE ASSY DRAWING | | | | | Change Requested on Contract
N/A | | | | Change Order
Drawing Change ☒ | | |
| Orig. | Date | Drawn | Date | Checked | Date | Proj. Eng. | Date | Proj. Mgr. | Date | | |
| _____ | | CHAMIS | 20 OCT 77 | M. Allin | 21-10-11 | * | | * | | | |
| | | | | | Change Board Date | | | RFI No. | | | DCR No. |
| | | | | | Chair. | | | Eng. | | | Q.C. |
| | | | | | C.M. | | | ECP No. | | | D/W No. |
| | | | | | Customer Approval
N/A | | | | | SERIALIZED ITEM | |
| AFFECTED | | | | | DISPOSITION OF ITEM | | | | | Concurrence of Class ☐ | |
| YES | | | | | NO | | | | | Immediate Compliance | |
| Master Layout | | | | | In Process | | | | | Effective Serial in Mfg. | |
| Eng. Spec. (ES) | | | | | In Stock | | | | | Optimum Cost | |
| Test Equipment | | | | | N/A In Process | | | | | Serial Req. Backfit | |
| P.O. Change Req'd. | | | | | N/A Compl. | | | | | End Item | |
| Assembly PL Revision Control | | | | | Use As Is | | | | | Not Affected | |
| Separate PL @ Rev. | | | | | Rework | | | | | Record Change Only | |
| Drawing @ Rev. | | | | | Scrap (MRB Req'd.) | | | | | Mfg. Job No. Affected | |
| | | | | | Parts Conform | | | | | 18-401 | |
| | | | | | Reinspect | | | | | | |
| | | | | | Repair (MRB Req'd.) | | | | | | |

DESCRIPTION OF CHANGE

REVISED & REDRAWN ON NEW FORMAT WAS: "A" SIZE 4 SHEETS

ADD TO P/L:

| | | | |
|----|---|--------------|---------------------------------------|
| 9 | 2 | L537 000 319 | IC, DUAL 4-INPUT, POS AND GATE (7421) |
| 11 | 1 | L609 002 348 | CAPACITOR, 1MF, ±10%, 50V |
| 12 | 3 | L609 002 317 | CAPACITOR, 270 PF, ±10%, 200V |
| 13 | 1 | L604 005 082 | CAPACITOR, 1KΩ, ±5%, 1/4W |

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